

AIR FORCE A-7D BRAKE PROBLEM

A hearing on the Air Force A-7D Brake Problem was conducted from 9:30am to 1:05pm on 13 August 1969 under the chairmanship of Senator Proxmire. It was the result of accusations by two employees who claimed that the Goodrich Company had coerced them to change test records so that an unsatisfactory brake could be qualified for flight tests. The transcript of the hearing is available from the U. S. Government Printing Office, Washington, D. C.

This case brings excerpts from the transcript, with small changes in arrangement. It reports the viewpoints of the two former employees, of Air Force Systems Engineers, of the General Accounting Office, and of the Goodrich Company.

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AIR FORCE A-7D BRAKE PROBLEM

WEDNESDAY, AUGUST 13, 1969

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ECONOMY IN GOVERNMENT
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The Subcommittee on Economy in Government met, pursuant to notice, at 9:30 a.m., in room G-308 (auditorium), New Senate Office Building, Hon. William Proxmire (chairman of the subcommittee) presiding.

Present: Senator Proxmire and Representative Conable.

Also present: Richard F. Kaufman, economist; and Douglas C. Frechtling, economist for the minority.

Chairman Proxmire: The subcommittee will come to order.

Our first witnesses this morning are Mr. Kermit Vandivier and Mr. Searle Lawson. Both gentlemen I understand are former employees of the Goodrich Co., and these are the gentlemen who initially provided information on which I made a statement about a Goodrich four-rotor brake on the floor of the Senate.

I thought it best to have Mr. Vandivier and Mr. Lawson appear and state to the committee the situation as they see it.

I understand, Mr. Vandivier, you have a prepared statement. You can handle it any way you wish. We have four other groups of witnesses scheduled to appear. This is the first group to appear this morning. We hope that we can limit this hearing to this one session and to give everybody an opportunity to speak.

You may begin now and then we will ask questions.

Mr. Vandivier. Thank you, Mr. Chairman.

*Mr. Vandivier's
Statement*

Chairman Proxmire. Could I ask first, it has been suggested by the staff, I think it would be helpful, because of the nature of this inquiry, if you would give us a brief statement as to your background.

Mr. Vandivier. I am 42 years old. I am a high school graduate. I worked for the Goodrich Co. for approximately 6 years. I am now employed as the staff writer for the *Troy Daily News*.

Chairman Proxmire. All right, sir.

And, Mr. Lawson, will you give us your background?

Mr. Lawson. Yes, sir. I am 28 years old and I am a college graduate and have a degree in aeronautical and astronautical engineering and a certificate in aircraft design technology. I am presently employed at LTV Aerospace Corp.

Chairman Proxmire. Ling-Temco-Vought?

Mr. Lawson. Yes.

Chairman Proxmire. Thank you.

Mr. Vandivier. In the early part of 1967, the B. F. Goodrich Wheel & Brake Plant at Troy, Ohio, received an order from the Ling-Temco-Vought Co. of Dallas, Tex., to supply wheels and brakes for the A-7D aircraft, built by LTV for the Air Force.

The tests on the wheels and brakes were to be conducted in accordance with the requirements of military specification Mil-W-5013G as prepared and issued by the U.S. Air Force and to the requirements set forth by LTV Specification Document 204-16-37D.

The wheels were successfully tested to the specified requirements, but the brake, manufactured by Goodrich under BEG part No. 2-1162-3, was unable to meet the required tests.

The laboratory tests specified for the brake were divided into two categories: dynamic brake tests and static brake tests.

The dynamic brake tests basically consisted of 45 simulated normal energy stops, 5 overload energy stops and one worn-brake maximum energy stop, sometimes called a rejected take-off, or RTO.

These simulated stops were to be conducted on one brake assembly with no change in brake lining to be allowed during the test.

In addition, a maximum energy brake stop (or RTO) was to be conducted on a brake containing new linings and still another series of tests called a turnaround capability test was to be performed.

The turnaround capability test consisted of a series of taxis, simulated takeoffs, flight periods and landings, and time schedule for the turnaround test was supplied by LTV to coincide with conditions under which the A-7D brake might operate on a typical mission.

Generally speaking, the brake successfully passed all the static brakes tests, but the brake could not and did not pass any of the dynamic tests I have just described with the exception of the new brake maximum energy stop.

During the first few attempts to qualify the brake to the dynamic tests, the brake ran out of lining material after a few stops had been completed and the tests were terminated. Attempts were made to secure a lining material that would hold up during the grueling 51-stop test, but to no avail.

Although I had been aware for several months that great difficulty was being experienced with the A-7D brake, it was not until April 11, 1968, almost a full year after qualification testing had begun, that I became aware of how these tests were being conducted.

The 13th attempt

The 13th attempt at qualification was being conducted under B. F. Goodrich Internal Test No. T-1867.

On the morning of April 11, Richard Gloor, who was the test engineer assigned to the A-7D project, came to me and told me he had discovered that some time during the previous 24 hours, instrumentation used to record brake pressure had *deliberately* been miscalibrated so that while the instrumentation showed that a pressure of 1,000 pounds per square inch had been used to conduct brake stops No. 46 and 47 (two overload energy stops) 1,100 p.s.i. had actually been applied to the brakes. Maximum pressure available on the A-7D is 1,000 p.s.i.

Mr. Gloor further told me he had questioned instrumentation personnel about the miscalibration and had been told they were asked to do so by Searle Lawson, a design engineer on the A-7D.

Chairman Proxmire. Is this the gentleman who is with you now, Mr. Vandivier?

Mr. Vandivier. That is correct. I subsequently questioned Lawson, who admitted he had ordered the instruments miscalibrated at the direction of a superior.

Upon examining the log sheets kept by laboratory personnel, I found that other violations of the test specifications had occurred.

For example, after some of the overload stops, the brake had been disassembled and the three stators or stationary members of the brake had been taken to the plant toolroom for rework and during an earlier part of the test, the position of elements within the brake had been reversed in order to more evenly distribute the lining wear.

Additionally, instead of braking the dynamometer to a complete stop as required by military specifications, pressure was released when the wheel and brake speed had decelerated to 10 miles per hour.

The reason for this, I was later told, was that the brakes were experiencing severe vibrations near the end of the stops, causing excessive lining wear and general deterioration of the brake.

All of these incidents were in clear violation of military specifications and general industry practice.

I reported these violations to the test lab supervisor, Mr. Ralph Gretzinger, who reprimanded instrumentation personnel and stated that under no circumstance would intentional miscalibration of instruments be tolerated.

As for the other discrepancies noted in test procedures, he said he was aware they were happening but that as far as he was concerned the tests could not, in view of the way they were being conducted, be classified as qualification tests.

Later that same day, the worn-brake, maximum energy stop was conducted on the brake. The brake was landed at a speed of 161 m.p.h. and the pressure was applied. The dynamometer rolled a distance of 16,800 feet before coming to rest. The elapsed stopping time was 141 seconds. By computation, this stop time shows the aircraft would have traveled over 3 miles before stopping.

Within a few days, a typewritten copy of the test logs of test T-1867 was sent to LTV in order to assure LTV that a qualified brake was almost ready for delivery.

Virtually every entry in this so-called copy of the test logs was drastically altered. As an example, the stop time for the worn brake maximum energy stop was changed from 141 seconds to a mere 46.8 seconds.

On May 2, 1968, the 14th attempt to qualify the brakes was begun, and Mr. Mr. Lawson told me that he had been informed by both Mr. Robert Sink, project manager at Goodrich — I am sorry, Mr. Sink is project manager — and Mr. Russell Van Horn, projects manager at Goodrich, that "Regardless of what the brake does on test, we're going to qualify it."

The 14th attempt

Chairman Proxmire. What was that?

Mr. Vandivier. The statement was, "Regardless of what the brake does on test, we're going to qualify it."

He also said that the latest instructions he had received were to the effect that if the data from this latest test turned out worse than did test T-1867, then we would write our report based on T-1867.

Chairman Proxmire. The statement was made by whom?

Mr. Vandivier. Mr. Lawson told me this statement was made to him by Mr. Robert Sink, projects manager and Mr. Russell Van Horn, project manager.

During this latest and final attempt to qualify the four rotor brake, the same illegal procedures were used as had been used on attempt No. 13. Again after 30 stops had been completed, the positions of the friction members of the brake were reversed in order to more evenly distribute wear.

After each stop, the wheel was removed from the brake and the accumulated dust was blown out.

During each stop, pressure was released when the deceleration had reached 10 miles per hour.

By these and other irregular procedures the brake was nursed along until the 45 normal energy stops had been completed but by this time the friction surfaces of the brakes were almost bare, that is, there was virtually no lining left on the brake.

This lack of lining material introduced another problem.

The pistons which actuate the brake by forcing the friction surfaces together were almost at the end of their allowable travel and it was feared that during the overload stops the pistons might actually pop out of their sockets within the brake, allowing brake fluid to spray the hot surfaces, resulting in fire.

Therefore, a metal spacer was inserted in the brake between the pressure plate and the piston housing.

This spacer served to make up for the lack of friction material and to keep the pistons in place.

In order to provide room for the spacer, the adjuster assemblies were removed from the brake.

The five overload stops were conducted without the adjuster assemblies and with the spacer in place.

After stop number 48—the third overload stop—temperatures in the brake were so high that the fuse plug, a safety device which allows air to escape from the tire to prevent blowout, melted and allowed the tire to deflate.

The same thing happened after stop number 49—the fourth overload stop. Both of these occurrences were highly irregular and in direct conflict with the performance criteria of the military requirements.

Chairman Proxmire. I understand you have a picture of this that might help us see it.

Mr. Vandivier. Yes.

Mr. Proxmire. Do you want to show that to us now?

Mr. Vandivier. I was going to show it here just a little bit later.

Chairman Proxmire. Go ahead.

Mr. Vandivier. For the worn brake maximum energy stop the adjusters were replaced in the brake and a different spacer was used between the pressure plate and the piston housing.

Now I have a copy, a picture of this brake just before it went on the maximum energy test, and here you may see at the top is the additional spacer that has been added in order to get sufficient braking action on the brake.

Chairman Proxmire. Who took that picture?

Mr. Vandivier. That was taken with a Polaroid camera. I am not sure —

Chairman Proxmire. I think it is only fair to the committee, Mr. Conable and the committee, to ask you about it later. You go ahead and we will ask questions.

Mr. Vandivier. All right.

In addition to these highly questionable practices, a turnaround capability test, or simulated mission test, was conducted incorrectly due to a human error. When the error was later discovered, no corrections were made.

While these tests were being conducted, I was asked by Mr. Lawson to begin writing a qualification report for the brake. I flatly refused and told Mr. Gretzinger, the lab supervisor, who was my superior, that I could not write such a report because the brake had not been qualified.

He agreed and he said that no one in the laboratory was going to issue such a report unless a brake was actually qualified in accordance with the specification and using standard operating procedures.

He said that he would speak to his own supervisor, the manager of the technical services section, Mr. Russell Line, and get the matter settled at once.

He consulted Mr. Line and assured me that both had concurred in the decision not to write a qualification report.

I explained to Lawson that I had been told not to write the report, and that the only way such a report could be written was to falsify test data.

Mr. Lawson said he was well aware of what was required, but that he had been ordered to get a report written, regardless of how or what had to be done.

*Who will
write the report?*

He stated if I would not write the report he would have to, and he asked if I would help him gather the test data and draw up the various engineering curves and graphic displays which are normally included in a report.

I asked Mr. Gretzinger, my superior, if this was all right and he agreed as long as I was only assisting in the preparation of the data, it would be permissible.

Both Lawson and I worked on the elaborate curves and logs in the report for nearly a month. During this time we both frankly discussed the moral aspects of what we were doing and we agreed that our actions were unethical and probably illegal.

Several times during that month I discussed the A7D testing with Mr. Line, and asked him to consult his superiors in Akron, in order to prevent a false qualification report from being issued.

Mr. Line declined to do so and advised me that it would be wise to just do my work and keep quiet.

I told him of the extensive irregularities during testing and suggested that the brake was actually dangerous and if allowed to be installed on an aircraft, might cause an accident.

Mr. Line said he thought I was worrying too much about things which did not really concern me and advised me to just "do what you're told."

About the first of June —

Chairman Proxmire. You skipped one line here.

Mr. Vandivier. Yes.

Chairman Proxmire. You said "I asked him" —

Mr. Vandivier. Yes. I asked Mr. Line if his conscience would hurt him if such a thing caused the death of a pilot and this is when he replied I was worrying about too many things that did not concern me and advised me to "do what you're told."

About the first of June 1968, Mr. Gretzinger asked if I were finished with the graphic data and said he had been advised by the chief engineer, Mr. H.C. Sunderman, that when the data was finished it was to be delivered to him—Sunderman—and he would instruct someone in the engineering department to actually write the report.

Accordingly, when I had finished with the data, I gave it to Mr. Gretzinger who immediately took it from the room. Within a few minutes, he was back and was obviously angry.

He said that Mr. Sunderman had told him no one in the engineering department had time to write the report and that we would have to do it ourselves.

At this point Mr. Line came into the room demanding to know "What the hell is going on." Mr. Gretzinger explained the situation again and said he would not allow such a report to be issued by the lab.

Mr. Line then turned to me and said he was "sick of hearing about this damned report. Write the — thing and shut up about it."

Chairman Proxmire. Let me ask you, you had this in quotes. Did you make a note of this at the time?

Mr. Vandivier. Yes.

Chairman Proxmire. Do you have your notes with you?

Mr. Vandivier. No. I have notes with me, yes. I am not sure if I have this note or not, but I have notes with me.

Chairman Proxmire. All right.

Mr. Vandivier. When he had left, Mr. Gretzinger and I discussed the position we were in and Mr. Gretzinger said that we both should have resigned a long time ago. He added that there was little to do now except write the report.

Accordingly, I wrote the report, but in the conclusion, I stated that the brake had "not" met either the intent or the requirements of the specifications and was therefore "not" qualified.

When the final report was typewritten and ready for publication, the two "nots" in the conclusion had been eliminated, thereby changing the entire meaning of the conclusion.

Discrepancies

I would like to point out at this time the various discrepancies between the military standards and procedures and the qualification tests actually conducted:

1. Brake pressure was cut on all stops at 10 miles per hour and the wheel allowed to coast to a stop.

2. The five overload stops were conducted with a spacer between the pressure plate and the piston housing.

3. The lining carriers used for the test were specially made with an additional 0.030 of an inch lining material. This was done to assure sufficient lining material on the carriers.

4. Stators in the brake were physically reversed after stop 30 and remained in those positions throughout the test.

Mr. Chairman, the next two sentences of my printed statement contain a typographical error, words have been omitted and I would like to insert those in at this time.

5. The worn brake RTO was conducted with an additional pressure plate between the original pressure plate and piston housing. This was done because allowable piston travel had been exceeded and without the additional pressure plate the brakes could not have been applied.

6. Prior to the worn brake RTO (maximum energy stop), the inside diameter of the lining carriers was increased by 0.120 of an inch to alleviate the severe shrinkage of the lining carriers on the torque tube caused by overheating.

7. On stops 48 and 49 (overload stops 3 and 4) the fuse plug eutectic material — material designed to melt at a specified temperature — melted, allowing the tire to deflate.

8. The torque plate and keyway inserts for the wheel had their drive surfaces chromeplated, because of extreme wear. This was not a production process on this brake.

9. Before the start of the tests and at teardowns the keyway inserts were sprayed with molybdenum disulfate (a lubricant).

10. After every stop the wheel and tire assembly were removed from the brake, the brake was blown out with high-velocity air and the keyway inserts and heat shield were wiped clean.

11. After stops Nos. 10, 20, 30, 40, 45, and 50 the brake was disassembled and the expansion slots in the lining carriers were cleaned of excess lining material and opened. Excess materials removed from between the segments in the rotors and the lugs and links on the rotors were cleaned and radiused by machining processes. This in a sense is equivalent to a minor overhaul in the brake linings.

In addition there were at least four other major irregularities in the test procedure.

These, gentlemen, are only irregularities which occurred during the testing. As for the report itself more than 80 false entries were made in the body of the report and in the logs.

Many, many of the elaborate engineering curves attached to the report were complete and total fabrications, based not on what had actually occurred, but on information which would fool both LTV and the Air Force.

I have already mentioned that the turn-around capability test which was supposed to determine what temperatures might be experienced by the brake during a typical flight mission, had been misconducted through a human error on the part of the test lab operator.

Rather than rerun this very important test, which would have taken only some 6 hours to complete, it was decided to manufacture the data.

This we did, and the result was some very convincing graphic curves. These curves were supposed to demonstrate to LTV and the Air Force exactly what the temperatures in the brakes had been during each minute of the simulated mission.

They were completely false and based only on data which would be acceptable to the customers.

I could spend the entire day here discussing the various elaborate falsifications that went into this report but I feel that, by now, the picture is clear.

The report was finally issued on June 5, 1968, and almost immediately, flight tests on the brake were begun at Edwards Air Force Base in California.

Mr. Lawson was sent by Goodrich to witness these tests and when he returned, he described various mishaps which had occurred during the flight tests and he expressed the opinion to me that the brake was dangerous.

That same afternoon, I contacted my attorney and after describing the situation to him, asked for his advice.

He advised me that, while I was technically not guilty of committing a fraud, I was certainly part of a conspiracy to defraud.

He further suggested a meeting with U.S. Attorney Roger Makely in Dayton, Ohio.

I agreed to this and my attorney said he would arrange an appointment with the Federal attorney.

I discussed my attorney's appraisal of our situation with Mr. Lawson, but I did not, at this time, tell him of the forthcoming visit with Mr. Makely.

Mr. Lawson said he would like to consult with my attorney and I agreed to arrange this.

Shortly thereafter, Mr. Lawson went to the Dallas offices of LTV and, while he was gone, my attorney called and said that, upon advice of the U.S. attorney, he had arranged an interview with the Dayton office of the FBI.

I related the details of the A-7D qualification to Mr. Joseph Hathaway, of the FBI.

He asked if I could get Mr. Lawson to confirm my story and I replied that I felt Mr. Lawson would surely do this.

Upon Mr. Lawson's return from Dallas, I asked him if he still wished to consult my attorney and he answered "I most certainly do."

Mr. Lawson and I went to the attorney's office, and Mr. Lawson was persuaded to speak to the FBI.

I wish to emphasize that at no time prior to Mr. Lawson's decision to speak to the FBI was he aware that I had already done so. His decision and mine were both the result of our individual actions.

Mr. Lawson related his own story to Mr. Hathaway, who advised us to keep our jobs and to tell no one that we had been to see him.

I might add here that he advised us that an investigation would be made.

About this time the Air Force demanded that Goodrich produce its raw data from the tests.

This Goodrich refused to do, claiming that the raw data was proprietary information.

Goodrich management decided that, since pressure was being applied by the Air Force, a conference should be arranged with LTV management and engineering staff.

Legal advice

A preconference meeting was set for Goodrich personnel in order to go over the questionable points in the report.

On Saturday, July 27, 1968, Mr. Robert Sink, Mr. Lawson, Mr. John Warren—A-7D project engineer—and I met and went over the discrepant items contained in the qualification report.

Each point was discussed at great length and a list of approximately 40 separate discrepancies was compiled.

These, we were told by Mr. Sink, would be revealed to LTV personnel the following week.

However, by the time of the meeting with LTV, only a few days later, the list of discrepancies had been cut by Mr. Sink from 43 items to a mere three.

Mr. Chairman, during this meeting Mr. Lawson took from the blackboard at the Goodrich conference room word for word listing of all these discrepancies. This contains the 43 items I have just mentioned.

I would like to enter this into the record, and also enter the subsequent list of three major discrepancies which later came out of this meeting.

Chairman Proxmire. Do you have copies of those documents?

Mr. Vandivier. Yes, I do have.

Chairman Proxmire. All right, those will be entered in the record.

(The documents referred to are shown in Exhibit I.)

Mr. Vandivier. The following 2-month period was one of a constant running battle with LTV and the Air Force, during which time the Air Force refused final approval of the qualification report and demanded a confrontation with Goodrich about supplying raw data.

On October 8, another meeting was held, again with Mr. Sink, Mr. Lawson, Mr. Warren, and myself present.

This was only 1 day prior to a meeting with Air Force personnel and Mr. Sink said he had called the meeting "so that we are all coordinated and tell the same story."

Mr. Sink said that LTV personnel would be present at the meeting with the Air Force and our policy would be to "Let LTV carry the ball." Mr. Sink appeared to be especially concerned because Mr. Bruce Tremblay, the Air Force engineer most intimate with A7D brake would be present at the meeting and it was felt at B. F. Goodrich that Mr. Tremblay was already suspicious.

Mr. Sink warned us that "Mr. Tremblay will probably be at his antagonistic best."

He added that the Air Force had wanted to meet at the Goodrich plant, but that we—Goodrich—couldn't risk having them that close to the raw data.

"We don't want those guys in the plant," Mr. Sink said.

What happened at the meeting with the Air Force, I do not know. I did not attend.

Resignation

On October 18, I submitted my resignation to Goodrich effective November 1.

I would like to read that resignation. This is addressed to Russell Line, manager of technical services:

In May of this year I was directed to participate in the preparation of qualification report for the A7D, 26031. As you are aware this report contained numerous deliberate and wilful misrepresentations which according to legal counsel constitutes fraud and therefore exposes both myself and others to criminal charges of conspiracy to defraud. In view of this fact, I must terminate my employment with the B. F. Goodrich Company effective November 1, 1968. I regret that this decision must be made, but I am sure that you will agree that events of the past seven months have created an atmosphere of deceit and distrust in which it is impossible to work effectively and productively.

On October 25 I was told that my resignation was to be accepted immediately, and within 20 minutes I had left the Goodrich Co.

Gentlemen, I am well aware that the B. F. Goodrich Co. is a well-known and well-respected firm with an almost impeccable reputation.

I am equally aware that the charges I have made are serious.

However, everything I have said to you is completely true and I can prove my statements with documentary evidence.

The unfortunate part of a situation such as this is that, invariably, many innocent persons are made to suffer along with the guilty.

Therefore, I should like to emphasize that three people whom I have mentioned here are, I feel, completely blameless and were implicated in this situation through no fault of their own.

Mr. Ralph Gretzinger from the very start fought this situation and tried very hard to use his influence to stop the issuance of the false report.

Mr. Richard Gloor, in his own handwriting, listed the irregularities occurring during the test and was outspoken in his opposition to the report.

This list was shown to B. F. Goodrich management.

Mr. Lawson, of course, was in a position similar to mine and the fact that he voluntarily disclosed the details of the A7D test program to the FBI and the GAO should stand upon its own merits.

Thank you.

Chairman Proxmire. Thank you, Mr. Vandivier.

Mr. Lawson

Mr. Lawson, you have heard the statement as read and I take it you have had a chance to see the full statement?

Mr. Lawson. No, I have not.

Chairman Proxmire. You have not?

Mr. Lawson. No, I have not.

Chairman Proxmire. The statement you have just heard read by Mr. Vandivier, do you agree with it fully or in part or do you disagree and can you tell us your reaction to it?

Mr. Lawson. The factual data that Mr. Vandivier has presented is correct, to the best of my knowledge.

Chairman Proxmire. There is no statement that you heard him read with which you would disagree in any part?

Mr. Lawson. I really don't know. I haven't read the complete text.

Chairman Proxmire. Would you disagree with any part of what you heard him read right now in your presence?

Mr. Lawson. No, I don't believe there is.

Chairman Proxmire. Let me ask you this. You say you worked for Goodrich for 6 years?

*Interrogation of
Mr. Vandivier
His Background*

Mr. Vandivier. That is correct.

Chairman Proxmire. What was your previous employment before you were hired by Goodrich?

Mr. Vandivier. I worked for the Food Machinery and Chemical Corp. at their Newport, Ind. plant.

Chairman Proxmire. Technical writer is a professional position that requires considerable competence and ability. What experience did you have that would qualify you to be a technical writer?

Mr. Vandivier. I had none.

Chairman Proxmire. Did you immediately go into this or did they give you a training course?

Mr. Vandivier. No. I had no training course. I kind of worked into the job I guess. It was---

Chairman Proxmire. You were not hired to be a technical ----

Mr. Vandivier. No; I was actually hired as an instrumentation technician, and Goodrich engaged in a mass changeover of instrumentation techniques, and they wanted degreed people for this kind of work so I was switched over to the technical writing section.

Chairman Proxmire. How long did you work as a technical writer?

Mr. Vandivier. Approximately 3 years.

Chairman Proxmire. Three years. How many reports did you prepare for B. F. Goodrich?

Mr. Vandivier. At least 100, possibly 150.

Chairman Proxmire. Were any of these reports questioned in any way?

Mr. Vandivier. No; they were not.

Chairman Proxmire. Were they accepted? Did you get any reaction at all favorable or unfavorable in these reports that you wrote?

Mr. Vandivier. Occasionally we would get a question from the manufacturer about a wording or a clarification, and these would be supplied.

Chairman Proxmire. Was there any question as to the accuracy or competence of the report?

Mr. Vandivier. No; none whatsoever.

Chairman Proxmire. Were you criticized at any time that the reports were not adequate?

Mr. Vandivier. No; I was not.

Chairman Proxmire. In your statement, you say "Accordingly I wrote the report but in the conclusion I stated that the brake had 'not' met either the intent or the requirement of the specification and therefore was 'not' qualified." Then you add "When the final report was typewritten and ready for publication the two 'nots' in the conclusion had been eliminated, thereby changing the entire meaning of the conclusion."

Now it seems to me that you have testified before this that you and Mr. Lawson constructed this report based on your instructions from your superiors, and that this report was false in many ways that you knew, and that the report seemed to qualify the brakes, at least that was the impression I got, and yet you concluded, and I quote, "I stated the brake had not met either the intent or the requirement of the specifications and therefore was not qualified."

Doesn't it seem on the basis of your testimony that this is somewhat inconsistent? In other words, you had written a report that would qualify the brake and then you come in with a one-sentence conclusion in which you say it was not qualified? Do you see what I am getting at?

*Vandivier's
motive*

Mr. Vandivier. Yes. Mr. Chairman, this was probably one final gesture of defiance. I was so aggravated and sick at having to write this thing. I knew the words "not" would be taken out, but I put them in to show that, I do not know, that they had bent me to their will but they had not broken me yet. It was a foolish thing perhaps to do, but it was showing that I still had a little spirit left. At least this is how I felt.

Chairman Proxmire. What did you think your superiors at B. F. Goodrich would do when they found the "not qualified" in your report, when you had been told to show the brake qualified?

Mr. Vandivier. I knew it would be changed probably without question. I was not worried if you are trying—I was not worried at being called on the carpet for this. I knew they would just merely change it.

Chairman Proxmire. Was this the only time in the 3 years you worked as a technical writer with Goodrich the only time that you made false entries into a report of manufacture?

Mr. Vandivier. Yes, it was.

Chairman Proxmire. So as far as you know B. F. Goodrich's record is clean in every other respect with your experience?

Mr. Vandivier. With me----

Chairman Proxmire. With this single incidence being an exception?

Mr. Vandivier. That is right; that is correct.

Chairman Proxmire. They had never before asked you to do this?

Mr. Vandivier. No.

Chairman Proxmire. Do you know of any other technical writer you worked with, in which Goodrich had instructed them to take this kind of action?

Mr. Vandivier. If they had done this, I would know nothing of it. I could not say.

Chairman Proxmire. This was the only incident?

Mr. Vandivier. Yes, as far as I know, the only incident which I was asked to do this.

Chairman Proxmire. What was the normal procedure at Goodrich when a brake failed to meet all of the requirements or when normal procedures were not followed?

Mr. Vandivier. If for some reason or other the normal procedure was not followed or the brake simply could not meet a particular requirement, the report was written and a deviation was requested from the manufacturer, which in other words is a request to allow him to accept the brake with these noted deviations from the procedure.

I might add that there are many times that a brake just could not meet a certain requirement specified by the manufacturer, and it was always the customary procedure to ask for a deviation, and many times it was granted or some sort of a compromise was reached between the manufacturer and Goodrich.

Chairman Proxmire. I cannot understand what was going through the minds of Goodrich's management the way you have told the story. I cannot see what they have to gain by passing on a brake that would not meet qualifications. Somewhere along the line this is going to be shown as an unqualified brake. As you pointed out, it might be under disastrous circumstances, but in any event Goodrich would suffer and suffer badly by passing on a brake to LTV or the Air Force that was not going to work. What is their motivation?

*Vandivier's explanation
of company actions*

Mr. Vandivier. I cannot tell you what their motivation is. I can tell you what I feel was behind this.

Chairman Proxmire. All right.

Mr. Vandivier. I feel in the beginning stages of this program someone made a mistake, and refused to admit that mistake, and in order to hide his stupidity, or his ignorance, or his pride, or whatever it was, he simply covered up, you know, with more false statements, false information, and at the time it came time to deliver this brake, Goodrich was so far down the road there was nothing else to do.

They had no time to start over. I think it was a matter not of company policy but of company politics. I think that probably three or four persons within the Goodrich organization at Troy were responsible for this. I do not believe for a moment that the corporate officials in Akron knew that this was going on.

Chairman Proxmire. I think that is right. I agree. I cannot imagine the top corporate officials deliberately lying about this. They have no motivation. All they can do is lose. All it can do is cause embarrassment, grief, loss, loss of respect and reputation, and I am sure that they would be very much opposed to this if they had known what was going on.

Well, I have a few more questions. I will be back.

Congressman Conable?

Representative Conable. Thank you, Mr. Chairman.

Mr. Vandivier, all we want to learn here is the facts, of course. It is a confusing business for a layman. I would like to ask you, you testified that you have a high school degree, and from that I assume that you had no great engineering experience beyond that which you gained from your work, is that correct?

*Questions from
the minority*

Mr. Vandivier. That is right. That is correct.

Representative Conable. Are you expected to make engineering judgements in your work as a technical writer or are you supposed to report facts?

Mr. Vandivier. Mil-W-5013 G, which is the controlling specification for aircraft wheels and brakes, spells out specifically what shall be done and what shall not be done during testing. It does not tell the user how to arrive at the engineering decisions, but it does tell him how this test shall be conducted, and this is written in black and white, and you have only to understand what shall be done according to this specification and what shall not. Do you understand what I am saying?

Representative Conable. Yes, I understand what you are saying. In other words, the answer is that you are not supposed to make engineering judgements as such, but you are supposed to follow the procedure?

Mr. Vandivier. That is correct.

Representative Conable. Were you motivated in any way with respect to this brake except by the circumstances? Did you have any involvement in the decision to make this type of brake or was there any reason why you delved so deeply into it as a technical writer?

Mr. Vandivier. I don't quite understand the question, Mr. Congressman.

Representative Conable. Do you know from whence the orders emanated originally to falsify this data? Do you know who was actually making the statements that you have reported here, but you do not know where the orders came from?

Mr. Vandivier. I do not know, no. I only know what I was told. I know that I had discussed this with Mr. Line who was not my immediate supervisor but one of my supervisors and asked him if he was aware of what was going on, and he said he was aware, and I asked him, as I have said in my statement here, if he did not think that this was a rather foolish thing to do. And one thing I did not mention in my statement—I was concerned that I did not think we were doing the Goodrich Co. justice by allowing this thing to go on, and without their knowledge, because I knew that the people in Akron would not dare risk their reputation on such a project.

Representative Conable. What is your employment now, sir?

Mr. Vandivier. I work for the Troy News. I am a staff writer.

Representative Conable. For a newspaper?

Mr. Vandivier. Yes.

Representative Conable. Were you working for a newspaper at the time?

Mr. Vandivier. I worked part time for approximately 3 years. I wrote a column three times a week.

Representative Conable. I see. And you went right from the Goodrich Co. to the newspaper?

Mr. Vandivier. Yes. When I began writing for the newspaper approximately 3 years, I had a standing offer to go to work for them at any time.

Representative Conable. That is all I have at this point, Mr. Chairman.

Chairman Proxmire. I would like to follow up, Mr. Vandivier. I was asking—let me ask this. Did you ever object to the project manager of the aircraft wheel and brake design section, Robert L. Sink, about what Goodrich was doing on the A-7 brake report that was unethical?

Mr. Vandivier. Yes. At our meeting just prior to the meeting with LTV, this was a day-long Saturday meeting, and I questioned Mr. Sink repeatedly about what we were doing, and I asked him how we could present anything to LTV without adding that we had been lying in the beginning.

*More questions
from the
Chairman*

Mr. Sink seemed to think that all we had to do was to make a clean breast of everything, and this would be sufficient, and I suggested that before you can tell the truth, you must first admit that you had lied, and Mr. Sink became extremely angry and I shut up. We went to lunch and after lunch he called me to his desk and said he apologized for losing his temper earlier that morning, and he said he did not see the situation as one in which we were lying. He said we were — his words were that we were exercising “engineering license,” and frankly I do not know what he means by engineering license.

I know what literary license is. I do not know what engineering license means.

Chairman Proxmire. I understand when engineering license is taken it loses engineering license. Why did you finally agree to take part in writing the false qualification report that you have described for the A-7D brakes?

Mr. Vandivier. Mr. Chairman, that is a question I have asked myself many times, and I can give you three reasons. I have seven children; I have a lot of bills; and I only have a high school education. That is the only excuse I can offer you.

Chairman Proxmire. It is my understanding the five-rotor brake is a good brake. I have said that. I understand that this is a brake that is now in use on aircraft. As far as I know, there is no question about this brake whatsoever. I want to make that absolutely clear, because I think there has been some confusion between the five-rotor brake which I understand is a good brake, a workable brake, it is not being challenged by anybody, it is accepted, it is in use. But it is the four-rotor brake which is the one that you have been discussing this morning?

Mr. Vandivier. Yes, everything I have said here is concerned with the 2-1162-3 brake which is the four-rotor brake.

Chairman Proxmire. Very good. All right, now Mr. Lawson, will you tell us again, please, what your job responsibilities were with Goodrich and how long you were employed with them?

*Interrogation
of Mr. Lawson*

Mr. Lawson. I started employment with B. F. Goodrich on January 16, 1967, and I was hired in as a project engineer, and my job duties were detail design of projects that were turned over to me from the proposal engineer.

Chairman Proxmire. And you worked for how long, until what date?

Mr. Lawson. Until October 25, 1968, so about 22 months, 21.

Chairman Proxmire. Approximately a little less than 2 years?

Mr. Lawson. Yes.

Chairman Proxmire. When did you first become aware that there was a basic design fault in the four-rotor braking?

Mr. Lawson. I believe I became aware of it after the — I would say two or three qualification attempts, which would be in December of 1967, in that area.

Chairman Proxmire. What was this basic fault?

Mr. Lawson. The brake would not make the required number of stops as far as life of the brake. It just would not make it.

Chairman Proxmire. Did you inform your superiors of this fault?

Mr. Lawson. Yes, I did.

Chairman Proxmire. What was their response?

Mr. Lawson. Well, I was told — I wanted to change the design. That was my original request to them, to put more weight into the brake, and I was flatly refused by Mr. Warren. He said we would not put more weight in the brake.

Chairman Proxmire. Flatly refused by whom?

Mr. Lawson. Mr. John Warren, and that we would not put any more weight into the brake. It was going to remain as is and we were going to qualify it.

Chairman Proxmire. Did either Mr. Sink or Mr. Van Horn ever tell you prior to the final qualification tests now what Mr. Vandivier told us "Regardless of what the brake does on the test we are going to qualify it."?

Mr. Lawson. Yes, sir.

Chairman Proxmire. Who told you that?

Mr. Lawson. Mr. Van Horn was the man who actually said the words.

Chairman Proxmire. Mr. Van Horn said that?

Mr. Lawson. And Mr. Sink was at the meeting at the time. There were just the three of us.

Chairman Proxmire. What was his job responsibility or position with Goodrich?

Mr. Lawson. Mr. Van Horn?

Chairman Proxmire. Yes.

Mr. Lawson. He was the project manager. He was in charge of proposals and items like that.

Chairman Proxmire. He was your superior?

Mr. Lawson. Yes, sir.

Chairman Proxmire. What was your reaction to that statement?

Mr. Lawson. I don't know. I guess I was just dumbfounded. I did not say anything except OK.

Chairman Proxmire. Didn't it shock you that after all he is telling you that even if the brake does not meet the tests we are going to say it does, isn't that correct?

Mr. Lawson. That is correct. I don't know. I guess I had no recourse. I just accepted it.

Chairman Proxmire. Your recourse was to resign immediately?

Mr. Lawson. Yes.

Chairman Proxmire. Or take it to a higher authority. Could you have taken it to somebody else above Mr. Van Horn?

Mr. Lawson. I really didn't feel there was anybody above him that I could take it to.

Chairman Proxmire. Did you assist in the preparation of Q 6031, the Goodrich report under discussion here today – and did that report contain numerous false statements?

Mr. Lawson. There were numerous erroneous statements in there. I would not use the word false. I do not know under what test they were telling me to do this, I do not know what motivations they had but there are changed statements in that qualifications report.

Chairman Proxmire. Changed statements you say?

Mr. Lawson. Yes.

Chairman Proxmire. How do you know they were changed?

Mr. Lawson. Because I changed them.

Chairman Proxmire. You changed them. And you did this on the basis of being told to qualify the brake?

Mr. Lawson. That is correct, sir.

Chairman Proxmire. Regardless of the situation. In order to do that you thought you had to change those statements?

Mr. Lawson. Well, I did not think I had to change them. I was told to change them.

Chairman Proxmire. I understand that these brakes, these 4-rotor brakes which we are discussing now — who told you to change the test data in the report?

Mr. Lawson. Mr. Robert Sink.

Chairman Proxmire. Mr. Robert Sink told you to change them?

Mr. Lawson. That is correct, sir.

Chairman Proxmire. I understand that these 4-rotor brakes we have been discussing were passed along to Ling-Temco-Vaught, LTV, and were actually tested in an aircraft?

Flight tests

Mr. Lawson. That is correct.

Chairman Proxmire. At Edwards Air Force Base?

Mr. Lawson. Right. They were tested on a flight test airplane.

Chairman Proxmire. It seems to me that on the basis of the testimony that you and Mr. Vandivier gave us, this was extraordinarily dangerous to the pilot involved. He could have been killed. The aircraft could have been destroyed, isn't that correct, or is it correct?

Mr. Lawson. I don't think it was as dangerous as I originally had thought it might be.

Chairman Proxmire. What is that?

Mr. Lawson. I don't think it was as dangerous as I had originally thought, as I became more familiar with the testing procedures and the safety precautions that they do have at the military test facilities, I realized it wasn't as dangerous as I thought, but I still believed it was a dangerous situation.

Chairman Proxmire. How about the danger of fire? Isn't this a real danger?

Mr. Lawson. Well, it is present. The brakes can weld up.

Chairman Proxmire. It could have happened?

Mr. Lawson. Well, yes, it could have happened.

Chairman Proxmire. What actually did happen when these brakes were tested? You said you were there.

Mr. Lawson. Yes, I was there.

Chairman Proxmire. How did the brake perform when the brakes were used?

Mr. Lawson. I don't know the exact number of occasions, but the lining surfaces of the brake did stick together and the airplane slid to a stop on occasions and the brakes had to be pried apart with a screwdriver to get it to roll again.

Chairman Proxmire. Describe as accurately as you can exactly what the brake did when the plane came in and the brakes were used?

Mr. Lawson. It would be landing under normal return from flight, and the pilot would touch down. They were doing brake tests, and he would apply the brakes at a certain velocity that was prescribed in the manuals, and they would be doing a normal braking roll and the brakes would lock up.

Chairman Proxmire. The brakes would lock?

Mr. Lawson. Yes. Well, they would stick together.

Chairman Proxmire. The plane would skid?

Mr. Lawson. Yes, and it would just slide.

Chairman Proxmire. The possibility under these circumstances heat would be generated within the brake which might cause a fire?

Mr. Lawson. Well, not after they stopped rotating, but while they were rotating heat was being generated.

Chairman Proxmire. This was a possibility?

Mr. Lawson. Yes.

Chairman Proxmire. How fast would the plane be traveling coming in?

Mr. Lawson. The speed varies with the weight.

Chairman Proxmire. GAO, in response to our question investigating the brake — we asked them to go ahead and investigate this discussion — stated in their report (see appendix) and I read on page 10, "In response to question regarding pilot safety and structural damage Federal Aviation Administration officials stated warping or welding of the brakes would blow out the tire which in turn might cause collapsing of the landing gear" No. 1.

2. Breaking of the hydraulic lines and/or puncturing of the gas tanks located in the aircraft wing.

As a result they further stated the most likely danger was a fire due to the combination of the heat in the brakes and leaking hydraulic fluid and/or jet fuel.

They also told us, however, they did not have any accident investigating reports concerning such instances.

On the basis of your expert knowledge and the fact that you were there at the time, were you concerned that this would be the situation?

Mr. Lawson. Originally I was.

Chairman Proxmire. As a danger?

Mr. Lawson. That is correct.

Chairman Proxmire. Why did you make the statement you made to the FBI?

Mr. Lawson. I believe my really feeling for going to the FBI was one of just, I guess, protecting myself. I realized from speaking with Mr. Warren, who had made statements to me to the effect that whenever something gets in trouble, referring to being at the Goodrich plant, you were on your own, don't look for your supervisors to be around, and from seeing experiences, experiencing things at Goodrich, where Mr. Sink had been involved in another incident, and somebody else was demoted, and other items like that, that I felt that I needed to talk to somebody about it, because it was a pretty serious situation, and the only person I could think of was to consult an attorney, and then he advised me to talk to the FBI.

Chairman Proxmire. What did you say in your statement to the FBI?

Mr. Lawson. I told them about the items in the testing procedures, what had gone on.

Chairman Proxmire. Can you provide the committee with a copy of your statement?

Mr. Lawson. To the FBI?

Chairman Proxmire. Yes.

Mr. Lawson. I really couldn't because I just gave it to them verbally and I did not record it. They must have a record.

Chairman Proxmire. Were any Government inspectors or employees involved in the testing of the brakes?

Mr. Lawson. No, they were not.

Chairman Proxmire. At any time?

Mr. Lawson. Not to my knowledge.

Chairman Proxmire. There were not present when the brakes were tested?

Mr. Lawson. There was not a requirement for them to be present on this test.

Chairman Proxmire. I want to thank you gentlemen very much for this testimony. I think it takes extraordinary courage to do what you have done. You were in a difficult position and you have agreed perhaps that if you had it to do over again you would have acted more expeditiously, but the fact that you did go to the Federal Bureau of Investigation, you did resign, you did suffer an economic risk and loss through this incident, I think is to your great credit, and I very much appreciate your testimony to us today. Thank you very much.

Mr. Lawson. Thank you, sir.

Chairman Proxmire. Our next witnesses are from the Air Force. Mr. Robert L. Hartman, chief systems Engineer, Headquarters, Aeronautical Systems Division, Wright Patterson, and Mr. Bruce Tremblay, Headquarters, Aeronautical Systems Division, AFSC, Wright Patterson Air Force Base.

Gentlemen, do you have a statement?

Mr. Hartman. Mr. Chairman, we do not have a statement as such. We do have some background information which refers to our qualifications and our role in the development of A-7D airplane and qualification of the brake.

Chairman Proxmire. This is very brief. The qualifications will be printed in the record.

Why don't you go right ahead and read this short page on your present position responsibility as to component qualifications.

(The background information of both witnesses follows:)

*Testimony by
the Air Force
Systems Engineers*

Their background

Background Information on Mr. Tremblay, Systems Group Leader for Landing Gear in Airframe Subsystem Directorate, Aeronautical Systems Division, Air Force Systems Command

NAME: David B. Tremblay.

TITLE: Systems Group Leader for Landing Gear in Airframe Subsystem Directorate, Aeronautical Systems Division.

QUALIFICATIONS: BME University of Dayton 1950; MBA Ohio State University 1969; Professional Engineering License, State of Ohio, No. 22661.

Major Assignments -

- 5 years automotive equipment test engineer;
- Approximately 4 years Air Force landing gear project engineer, particular specialty of wheels and brakes;
- 1½ years - Group Leader Aircraft Wheel and Brake R&D, Bendix Products Division of Bendix Corp. in South Bend, Indiana;
- 5 years Air Force landing gear subsystem engineer on C-141A and F-111; and
- 3½ years Systems Group Leader for Landing Gear in Airframe Subsystem Directorate of Aeronautical Systems Division. Exercise technical cognizance of all systems under development with specific responsibility for A-7D.

A-7D RESPONSIBILITIES:

I am responsible for technical review of A-7D landing gear equipment. I recommend approval or disapproval of Ling Temco Vought equipment specifications, proposed test procedures and resulting test reports to the Aeronautical Systems Division A-7D Systems Engineer. These recommendations are based upon comparison with military specification technical requirements and experience obtained on other development programs. On the A-7D, this level of review was exercised on the anti-skid brake control system, wheels, brakes and tires. These items are A-7D peculiar and have been developed specifically for this application.

Background Information on Mr. Hartman, Chief System Engineer, A-7D Airplane, Aeronautical Systems Division, Air Force Systems Command

NAME: Robert L. Hartman.

TITLE: Chief System Engineer, A-7D Airplane.

QUALIFICATIONS: BSME Purdue University 1950; Employed at WPAFB 1954 - Present

Major Assignments -

- 1954-1959 - Development Engineer, Propulsion Laboratory, for Fuel System and Mechanical Equipment;
- 1959 - 1961 - Senior Development Engineer, Rocket Propulsion Laboratory Field Engineering Office, for Solid Rocket Motor Development;

1961-1963 - Asst. Chief Airframe and Propulsion Division GAM-87A Engineering Office, Responsible for engineering development of airframe and propulsion system;

1963-1966 - Chief Engineer, Systems Engineering Directorate Responsible for providing technical guidance and engineering direction to the F-104 G airplane and GAM-77 (Hounddog) missile program offices; and

1966-Present - Chief Systems Engineer, Systems Engineering Division. Responsible for providing engineering guidance and technical direction to the A-7D airplane program office.

PRESENT POSITION RESPONSIBILITIES

As the Chief Systems Engineer, I provide engineering and technical support to the A-7D Program Management Office (PMO) located in the Main Navy Building, Washington, D.C. This office is a joint Navy/Air Force program management office.

As the Chief System Engineer, I determine the level of technical review required, the technical disciplines necessary to accomplish the review, assign the tasks and establish the priorities.

The engineering support provided involves technical review and recommended action on all engineering data necessary to develop the A-7D airplane. This includes specifications, test programs, test reports, engineering inspections and reviews.

COMPONENT QUALIFICATION RESPONSIBILITIES

As the Chief System Engineer, I provide assurance that the procurement specifications contain sufficient and valid requirements for use on the weapon system. I assure that the testing accomplished verifies compliance to the procurement specification requirements. I monitor the flight testing of the component and evaluate this testing as evidence of compliance or noncompliance to the airplane requirements. I provide recommendations to the Program Management Office relative to the qualification status of the component under evaluation and recommend appropriate action.

Interrogation

Chairman Proxmire. According to Mil-W-5013G the specifications governing the brakes used for qualification tests, the brake which is used for qualification tests is supposed to be identical, it has to be, in the production of the brake. In your opinion, judging from the testimony you have heard this morning, and from the photograph which I take it is in front of you at the present time, which Mr. Vandivier had brought with him, and from information contained in the GAO report, was that B. F. Goodrich four-rotor brake qualified identical to brakes slated for production?

Mr. Tremblay. The brake shown in the picture is not identical to the production brake that was delivered for the flight test program.

Chairman Proxmire. In what way does it differ?

Mr. Tremblay. It has two plates between the brake housing and the first rotating disk.

Chairman Proxmire. Do you want to comment, Mr. Hartman?

Mr. Hartman. No, I do not want to comment on this. I defer to his technical judgment.

Chairman Proxmire. Do you agree with him? Are you technically qualified to comment on that question?

Mr. Hartman. I do not believe I am qualified to comment on the detailed design of the braking system.

Chairman Proxmire. How would that part that had apparently been inserted in this test brake make a different production brake? Why, Mr. Tremblay, would that make a difference in testing? Can you explain that to us?

Mr. Tremblay. My technical judgement would be that if the lining had worn sufficiently, there was danger of the pistons exceeding their allowed travel in the housing. This would prevent that.

In other words, it would act as a spacer.

Chairman Proxmire. As I understand it, then, what this would do is to make it show up better in the wear and tear on the lining, is that correct?

Mr. Tremblay. No, sir.

Chairman Proxmire. All right, explain it to us again.

Mr. Tremblay. It would permit it to complete the stop without losing the piston from the housing.

Chairman Proxmire. What it would do is permit it to pass the test when otherwise it might not pass the test, is that right?

Mr. Tremblay. It depends on when it was inserted, sir. I do not believe I understand your question completely. You mean complete the one run involved or for the whole test program?

Chairman Proxmire. The one run involved.

Mr. Tremblay. In trying to recall Mr. Vandivier's testimony, he indicated that this brake was used in this configuration for the worn brake RTO. Worn brake RTO by instruction in the Mil Spec is for information only. The purpose of the test is to determine the mode of failure. It is known that the brake will fail during the conducting of this worn brake RTO.

Chairman Proxmire. Let me ask you this. We have heard this morning that during the qualification test B. F. Goodrich disassembled the brake being tested for qualification for the A7D and cleaned, machined and generally reworked the brake. Is this process permissible according to military specification and/or industry accepted practice during qualification tests?

Mr. Tremblay. No, sir; it is not.

Chairman Proxmire. It is not. And you think that kind of practice and test—would it make the test still valid?

Mr. Tremblay. No.

Chairman Proxmire. Or would it invalidate the test?

Mr. Tremblay. It would invalidate the test in my technical opinion.

Mr. Hartman. Excuse me, Mr. Chairman.

Chairman Proxmire. Yes, Mr. Hartman?

Mr. Hartman. The specification does not specifically address this particular subject but it is accepted practice that you not do this sort of thing.

Chairman Proxmire. All right, now let me ask finally, I want to ask you this. I would like to ask you if the real facts of the test had been known, would you, Mr. Tremblay have advised that the flight test proceed?

Mr. Tremblay. I am not really sure what the real facts are.

Chairman Proxmire. All right, if the facts had been known as have been testified this morning by Mr. Vandivier.

Mr. Tremblay. I would have requested that they stop the flight test, yes.

Chairman Proxmire. That the flights not go ahead?

Mr. Tremblay. Yes, sir.

Mr. Hartman. Mr. Chairman, if I may, I think that at a minimum we would have had a more detailed review. We would have had to insist upon that before we made the decision with respect to whether the flight tests would continue.

Chairman Proxmire. At any rate you went ahead on the basis of this report?

Mr. Tremblay. No, sir.

Chairman Proxmire. To fly the plane which indicated that the brakes were safe enough and they were not safe enough, at a minimum as you say, Mr. Hartman, you would have asked for more information, and Mr. Tremblay, you testified that you would have not advised that the plane fly?

Mr. Tremblay. Mr. Chairman, the report was not reviewed until August 1968, and these tests were conducted in June.

Chairman Proxmire. Why didn't the Air Force find out what was in the FBI report?

Mr. Tremblay. As an engineer, sir, I do not know.

Mr. Hartman. As engineers that is not in our—

Chairman Proxmire. What is that, sir?

Mr. Hartman. As engineers that is not in our scope of responsibility.

Chairman Proxmire. When you heard that the FBI was involved why didn't you inquire about it?

Mr. Hartman. This is a management task as far as I am concerned. The management, we knew, were aware of it.

Chairman Proxmire. Did you advise management under these circumstances that the FBI was involved, that you ought to be informed?

Mr. Hartman. We advised management of the knowledge that we had that there was an FBI investigation.

Chairman Proxmire. Mr. Conable?

Representative Conable. One last question. I am referring now to a statement which was made by Mr. R. G. Jeter, vice president and general counsel of the B. F. Goodrich Co. I would like to ask you if this is a correct statement:

It is most significant that 4-rotor brake knitting problem referred to above could not have been predicted from the indoor laboratory tests which the contract required regardless of how precisely these tests may have been performed. And the knitting problem was the only significant field problem with the 4-rotor brake.

Is that correct, or would you challenge that statement?

Mr. Tremblay. I believe I would challenge that statement, sir, because—

Representative Conable. You disagree with that statement, Mr. Tremblay?

Mr. Tremblay. Yes, sir; I do.

Representative Conable. In other words, it could have been predicted that there would be a knitting problem from the indoor laboratory tests if the tests were conducted correctly?

Mr. Tremblay. That is my opinion; yes.

Chairman Proxmire. So we have the testimony of Mr. Lawson to that effect, and we have your testimony to that effect.

Gentlemen, thank you very much for your very helpful testimony.

Our next witnesses are from the General Accounting Office. We have here Richard W. Gutmann, Guy A. Best, Stanley R. Eibetz, and Jerome P. Pederson. Mr. Gutmann, you have the honor of leading this delegation.

Mr. Gutmann. Yes, I do.

Chairman Proxmire. You have a concise statement. It will only take 3 or 4 minutes to read it. Let me say, before you begin, that the GAO report, "Review of the Qualification Testing of Brakes for the A-7D Aircraft," will be included in the record at the conclusion of today's proceedings. (Not included in this abstract.)

Go right ahead, Mr. Gutmann.

Mr. Gutmann. Mr. Chairman and members of the subcommittee, we are pleased to appear before the subcommittee today in response to your invitation of August 7, 1969.

The review of the brake qualification testing performed by the B. F. Goodrich Co. was performed in response to your request of May 13, 1969, for an inquiry into (1) the accuracy of the reported qualification test results; (2) the effect of defective brakes on the test pilot's safety; (3) the identification of additional costs, if any, incurred by the Government to obtain an acceptable brake; and (4) the responsibilities of the Government, including Air Force actions, in the qualification testing.

*Statement from
the General
Accounting Office*

The A-7D aircraft was purchased for the Air Force by the Navy from LTV Aerospace Corp., Vought Aeronautics Division, Dallas, Tex. LTV awarded a subcontract to the B. F. Goodrich Co., Aerospace and Defense Products Division, Dallas, Tex., for the development and production of brakes for the A-7D aircraft. The subcontract was performed at Goodrich's plant in Troy, Ohio.

In performing this assignment we took the following steps: (1) we reviewed the qualification test procedures and compared the actual and reported qualification test results at Goodrich; (2) we discussed qualification test procedures with LTV officials and Air Force engineers; (3) we reviewed the applicable specifications for qualification testing; (4) we discussed potential harm to pilot and aircraft resulting from defective brakes with the Federal Aviation Administration, Air Force, Navy, and LTV officials, and LTV, Navy, and Air Force test pilots who had flown the A-7D aircraft; (5) we reviewed prime contractor and military flight reports and flight discrepancy sheets; (6) we reviewed the prime contract, the subcontract, and other documents and correspondence relating to the pricing and/or configuration of the brakes; (7) we discussed the effect of brake problems on aircraft testing and delivery with an Air Force engineer and LTV officials; and (8) we reviewed documents regarding the prime contractor and Government responsibilities with personnel of LTV, the Air Force, and the Defense Contract Administration Services District Dayton, personnel.

The results of the review have been summarized in the digest of our report to you, Mr. Chairman, dated July 3, 1969, and in a subsequent letter dated July 11, 1969.

In summary our work shows that:

In some instances Goodrich's test procedures for the four-rotor brake did not appear to comply with specification requirements or normal industry practice.

Goodrich's qualification report on the results of testing the four-rotor brake contained some discrepancies that may be considered significant.

Chairman Proxmire. Would you repeat that statement again?

Mr. Gutmann. Goodrich's qualification report on the results of testing the four-rotor brake contained some discrepancies that may be considered significant.

In our opinion Goodrich should have accurately reported test results, since in the absence of accurately reported test results it is difficult, if not impossible, to properly evaluate product performance.

Opinions differed as to the potential danger to the pilot and damage to an aircraft due to brake failure. However, no significant aircraft damage due to the use of the four-rotor brake had been reported.

Goodrich offered to, and did, replace the four-rotor brake with a new five-rotor brake without any apparent increase in cost to the prime contractor or the Government. We were advised that the change did not cause any delays in the delivery or testing of the aircraft.

The prime contractor's procedures and those of the Defense Contract Administration Service District were inadequate to protect the Government's interests in the qualification tests of the four-rotor brake.

The Department of the Air Force protected the Government's interest by withholding approval of the qualification report.

As you know, Mr. Chairman, in this case we did not follow our usual practice of obtaining written comments on the matters discussed in the report from the parties involved; that is, Goodrich, LTV, and the Department of Defense.

This concludes my statement Mr. Chairman. My colleagues and I would be pleased to try to answer any questions that the subcommittee may have.

Representative Conable. I am interested, Mr. Gutmann, in the wording you have used here in your summary. You say:

*Interrogation of
Mr. Gutmann*

Goodrich's qualification reports and the results of testing the 4-rotor brake contain some discrepancies that may be considered significant.

You did not really come right out and say it was significant. Why did you use that wording? Simply because of the limitations in your investigation? They might be significant and then again they might not. Why did you say it that way?

Mr. Gutmann. Well, sir, we did not intend to use that word "may" in the sense of "might". It is not the conditional "may".

Representative Conable. I see. In other words, you considered that they were significant?

Mr. Gutmann. Yes, sir.

Representative Conable. Fine, I am glad to have that cleared up. Now the qualification report was one check in the production process and not the only one, and I am interested in your statement here that the procedures were inadequate to protect the Government's interest. The fact is this difficulty was discovered by other check down the line; namely, the flight test.

Is it your feeling that this was inadequate limited to the lack of Government participation in the inspection process at the time of the laboratory tests, or what is your feeling?

Mr. Gutmann. Yes, sir. Although the flight tests subsequently revealed some problems with the brakes, it appeared to us that for the qualification testing to have real meaning and value, it should be performed before the flight test which is not necessarily the case.

Representative Conable. Yes.

Mr. Gutmann. And it is basically the lack of participation in the qualification testing where we consider the procedures inadequate.

Representative Conable. You do not feel that we have anything but a quality product in the plane that has finally been evolved here, do you?

Mr. Gutmann. We know of nothing adverse in this regard.

Representative Conable. I quite agree that it is ridiculous to have a Government inspector sign the report unless it is going to mean something, and I am confused about why he did sign the report. There may be very good reasons for not involving him too directly in the process, which is essentially, at this stage anyway, a responsibility between subcontractor and contractor, but it certainly is confusing to have him apparently attesting to something although the statement he makes does not appear to guarantee a darn thing. I quite agree with you that that is a confusing aspect of this, why he should have signed the report at all is shrouded in mystery.

Mr. Gutmann. Yes.

Representative Conable. Is that usual at this stage? Do they require a Government signature on the report?

Mr. Gutmann. Yes, they do, and in many instances I am afraid it simply means that the man has seen it.

Representative Conable. That is all I have, Mr. Chairman.

Chairman Proxmire. Thank you very much, gentlemen. We appreciate your appearance.

Mr. Gutmann. Thank you, sir.

Chairman Proxmire. Our final witnesses this morning are from the Goodrich Co.: Mr. R. G. Jeter, vice president and general counsel, and Mr. Robert L. Sink, the projects manager, aircraft wheel and brake design.

Mr. Jeter, you go right ahead, sir.

*Statement from
the Goodrich
Company*

Mr. Jeter. Mr. Chairman, members of the committee, my name is R. G. Jeter and I am vice president, general counsel and secretary of the B. F. Goodrich Co.

I have with me on my left Mr. Robert Sink, who is a senior wheel and brake design engineer and projects manager.

I would like if I may to read my statement and interject a few remarks in response to statements which have been made here this morning.

The B. F. Goodrich Co., now in its 99th year, for many years has been a leading manufacturer of airplane wheels, brakes, tires, and other equipment. Many thousands of our airplane brakes are now in service on commercial airlines and military planes, both in this country and throughout the world.

I am sure that some people who have listened to this testimony this morning might wonder whether our company is capable of making a satisfactory airplane brake, and let me assure them that we are. We are, in fact, one of the very leading manufacturers in the world.

We manufacture the brakes for the Boeing 707, 720, 727, and the new, very large Lockheed L-1011. The Lockheed Jetstar, the Beech Kingair, and other commercial and private planes also use B. F. Goodrich brakes.

In the military field we have supplied the wheels, brakes, and tires for the giant Lockheed C-5A transport, the General Dynamics F-111 fighter interceptor, the Lockheed SR-71, the North American XB-70 supersonic bomber, the LTV A-7D under discussion here, as well as a variety of other fixed wing and helicopter type military aircraft now in service, and we expect to manufacture a great many hundreds more before we are finished.

In listening to the testimony of the two first witnesses, I just wanted to suggest that to me it seemed incredible that more than 30 engineers, professional men who work at this plant, our Troy plant, would continue to work for a company which would countenance any, any of the conduct described by Mr. Vandivier and Mr. Lawson. It appears that everybody at our Troy plant is out of step, or were out of step, except these two men. That is the substance of their testimony.

Now the Chairman has raised the question, as has Mr. Conable, what did the company stand to gain by this? Why would the company do this? Why would we deliberately falsify records? Why would we produce a defective brake? There is not any reason under God's creation why we would do it. The fact of the matter is we contracted with LTV to manufacture satisfactory, workable, efficient brakes for an aircraft.

This is our obligation under our contract. We contracted to do this for a fixed sum of money--and we are talking about I think \$90,000--and this is our obligation.

Now why go and produce a brake and go through all the agony and tests and everything else of producing a defective brake so that we could set about then and manufacture another brake, to design a new brake and manufacture another brake which would work?

What on earth would be the point of this? It escapes my imagination or conception. I do not understand why such a thing could possibly happen.

We engineer and manufacture these airplane brakes and wheels at the plant in Troy, Ohio, which specializes in only these products.

This plant includes laboratory testing facilities for aircraft brakes which are second to none in the industry.

In short, B. F. Goodrich enjoys an excellent reputation within the aircraft industry as a supplier of these products.

This hearing is concerned with airplane brakes supplied by B. F. Goodrich as a subcontractor of Vought Aeronautics Division, of LTV (hereafter referred to as LTV) for the A7D light attack aircraft for the U.S. Air Force, as you gentlemen know.

On June 28, 1967, B. F. Goodrich was awarded a contract by LTV to supply a four-rotor brake for the A7D aircraft.

The four-rotor brake was designed and several were made for the indoor laboratory tests required by LTV in the contract. You understand the tests that were to be performed on this brake were not all of the tests that have ever been conceived by man.

The tests that were to be performed on this brake were the tests specified in the contract, and that is what I shall be talking about. And I say that because at the Chairman's questioning a couple of gentlemen here have disagreed with the statement that the knitting would not have arisen in the laboratory test if they had been most precisely and properly performed, and they have said that that is not so.

Well, the point of the matter is it is so, and I insist upon the statement, if you are talking about laboratory tests prescribed by our contract, so let us just keep that in mind.

Now this brake was designed, several were made, and then upon completion of these indoor tests in May 1968, it was the judgment of the responsible B. F. Goodrich aircraft brake engineers that the four-rotor brake satisfactorily performed the indoor tests and was ready for field testing on the A7D aircraft. Brakes of this design were then installed on a test airplane and given flight tests by LTV pilots at Edwards Air Force Base.

Between May 1968 and January 1969, LTV pilots made, as reported by the General Accounting Office, 229 test flights using the four-rotor brake.

Now let us just keep this in mind also. We are talking about a brake that was on an airplane, or more than one airplane, whichever the case, on which 229 flights were flown by test pilots who, of course, deliberately subjected the equipment, the entire equipment, to the most stringent use.

In all of these 229 test flights the four-rotor brakes performed the braking function. No one has said anything to the contrary here. They brought the plane to a stop, as a matter of fact, in less than the required distance, and these are the records.

There were no brake-related safety incidents involving, and we do not need to use weasel words about this, these are the facts, and the Air Force and LTV's records will substantiate it, there were no safety incidents involving either the pilots or the planes, a fact confirmed at page 11 of the GAO report.

However, in these 229 flights, as noted by the GAO report, page 11, the pilot reported 12 flights and I would like to emphasize this now if I may, out of the 229 flights they reported 12 flights during which there were, and I quote "potential" problems with the brake system.

Now that is the heading of the chart in which they record this problem. There were 12 flights out of 229 in which there were "potential" brake problems.

It should be understood at this point—and I am not sure that it is understood—that a brake system on an airplane consists of three principal components, one of which we manufactured, namely the brake, the other an antiskid mechanism, and the third, the brake hydraulic system.

In other words, this is the brake system, and all three of these things are required if you are going to have a brake that functions on an airplane.

Of the three parts, we manufactured the brake. We did not manufacture the other two items. We did not in our laboratory tests of the four-rotor brake prior to flight tests have available to us, we did not test the brake system, the entire brake system, hydraulic and the antiskid mechanism, we did not manufacture.

Pursuing these flight tests of the four-rotor brake—and I say listening to this testimony one might suspect that this brake fell off the airplane and on the first taxi down the runway—LTV flew 229 test flights, and these 12 potential problems which I have mentioned.

Now of the 12 potential problems, only two, in only two of the flights in which the brake system problem was noted was there a problem related to the four-rotor brake—in two flights out of these 229.

This problem was that the brake linings — and our engineers have described this — knitted or fused slightly at low speeds, and this was mentioned a moment ago in connection with safety. This problem occurred at low speeds.

As I say, it has never been determined whether the knitting problem resulted from the brake design, or was because of an incompatibility between the brake and its associated parts of the braking system.

This was not determined because we set upon another course rather than try to blame the problem on some other part.

In the same period — I have mentioned 229 test flights by LTV test pilots — in this same period, military pilots flew 38 test flights with his four-rotor brake. These, of course, were in addition to the 229. The military test pilots reported no brake system problems in the 38 test flights which they conducted. Again I say this was not a defective brake that fell off the plane the first time they started down the runway with it. They flew 229 plus 38 flights, test flights, and there were 12 potential problems regarding the brakes in that total number of test flights, and there were two problems which involved this knitting or sticking together of the parts, whatever they were.

So let us reduce this thing. We can be factual about it I hope, and let us reduce it to its facts. Let us see what the problem is, and this is the problem.

We had a fusing or a knitting in this brake in two flights out of 299 plus 38, a total of 337 flights, and that is the only real brake problem they had on this airplane.

I make the statement — and the chairman has questioned a couple of witnesses about it — and I want to make the statement again, and stand by this statement.

I meant exactly what I said in the statement, notwithstanding what some of the witnesses have said. I say it is most significant that the four-rotor brake knitting problem referred to above could not have been predicted from it, from the indoor laboratory tests which the contract required, regardless of how precisely these tests may have been performed. And the knitting problem was the only significant field problem with the four-rotor brake.

Now I trust I make the point that the statement is based upon testing the brake pursuant to the specifications of our contract, which is what we did.

It was during the period from June 14 to July 5, 1968, in flight testing at Edwards Air Force Base that the knitting problem appeared. The company's engineers immediately initiated a two-phase program to deal with this problem without regard to whether the real cause was the brake itself or the brake system.

The program was: (1) we set about to study other possible linings for the four-rotor brake which would have a higher fusion level; and (2) we set about to design a five-rotor brake in the event the lining development was unsuccessful.

During September 1968, we started testing a new five-rotor brake. This is a month before Mr. Vandivier left our company, but he apparently did not know anything about this.

Concurrently, B. F. Goodrich obtained from LTV an antiskid mechanism and tested it in combination with the four-rotor brake. These were our first laboratory tests of the entire brake system. The tests of the entire brake system were in no way provided for or involved in our contract, but since we had a problem, we obtained the system, the rest of the system, so that we could make a test with the entire system. And with the entire system, our engineers designed a test, and note my words, we designed a test for the purpose of attempting to simulate or duplicate the knitting problem in the laboratory.

We did determine from this test, we concluded at least from this test that a brake lining change would probably not solve the problem, whereas a 5-rotor brake design probably would be satisfactory.

Our engineers reached that conclusion.

Now the chairman has stated that B. F. Goodrich did not "qualify" the five-rotor brake for the A-7D until after GAO had made its investigation and recommended improved procedures.

The facts are that B. F. Goodrich satisfactorily completed evaluation tests on the five-rotor brake on October 17, 1968, and the results of these tests were reviewed with LTV on October 21, 1968. The five-rotor brake was formally recommended to LTV on October 29, 1968. The fact of the matter is that the GAO investigation was not begun until many months later, to be precise, on May 28, 1969.

Formal qualification testing of the five-rotor brake was completed in December 1968, and the first shipment of these new five-rotor brakes was delivered to LTV on January 12, 1969.

On February 13, 1969, the formal qualification report for the five-rotor brake was approved by LTV. Beginning January 27, 1969, and continuing to the present time, I am told, the five-rotor brake has been flight tested on an A-7D by both LTV and military test pilots. The test pilots have reported no significant brake problem, and I guess that has been agreed to by everyone here.

The essential facts of this matter I summarize as follows:

1. There have been no safety incidents — personal injury or property damage — resulting from the flight testing of either the four-rotor or the five-rotor brake, the GAO report on pages 10 and 11 are my authority for this statement.

"Air Force, Navy, and LTV/VAD officials generally agreed that the brakes did not endanger the life or safety of the test pilots."

2. The total experience with both brakes was a typical one. And I understand the chairman is talking about the four-rotor brake, but I am talking about both brakes, because we had a contract to perform for the Government, well, for LTV and the Government, and I am telling the story of what happened in the performance of this contract including the four-rotor brake total experience with both brakes on the A-7D, a new airplane, was a typical one. And I am telling you we have thousands of brakes on airplanes flying in this country.

Obviously, the reason a new airplane brake must be subjected to rigid flight testing is because indoor laboratory tests alone do not always provide a reliable guide to the performance of the brake on the aircraft, and I daresay that the Air Force will not disagree with that statement.

3. Now further, B. F. Goodrich engineers moved quickly, and I think my listing of dates substantiates that certainly, to provide a solution to the knitting problem with no delay in the aircraft program, and the GAO report supports this.

4. The substitution of the 5 rotor-brake, and Mr. Chairman, I trust that you will not further question the conclusion of the General Accounting Office, which was that the 5-rotor brake was in fact provided under the contract with no additional cost to anybody except B. F. Goodrich, and this is the fact of it; and 5, both the LTV and the Air Force have expressed their satisfaction with our 5-rotor brake.

Now I want to refer to the General Accounting Office Report of its investigation of it and I would like to point out at this time that Mr. Vandivier has testified here that he has told his tale to the General Accounting Office. It had the benefit of this story of his for whatever it was worth in the course of their investigation.

On May 28, 1969, the GAO began its investigation of the B. F. Goodrich A7D aircraft brake program.

I might interject at this point to say it was a rather thorough investigation. They were at our plant 8 or 10 days, I am not sure of the exact count, but quite a few days. They were provided access to all test data which had been compiled in the indoor testing of the 4-rotor brake.

*Summary by
Mr. Jeter*

*Comments on the
GAO Report*

Engineers of B. F. Goodrich who were directly associated with this project and who had worked in the program cooperated fully in answering questions and explaining the test data.

We now know that early in July 1969 the GAO delivered its report to Senator William Proxmire. The GAO did not submit copies of the report to the Defense Department, LTV, or B. F. Goodrich for either review or comment. In fact, B. F. Goodrich first received the GAO Report on August 4, 1969, one day after Senator Proxmire had delivered his statement to the news media.

Further, the Senator did not contact B. F. Goodrich until after his public accusations.

There are only two "Findings and Conclusions" in the GAO Report which are in the least critical of B. F. Goodrich. It is significant that the news statement B. F. Goodrich issued on August 4, 1969, in response to Senator Proxmire's press release, incorporated all the "Findings and Conclusions" of the GAO Report.

Now as to the critical findings, the first regarded our test procedures. GAO stated that in some instances our laboratory test procedures for the 4-rotor brake "did not appear to comply with specification requirements or normal industry practice." Our answer:

*B. F. Goodrich's
test procedures*

(a) LTV approved our interpretation of the contract specifications to end the test runs in a rolling stop. The energy level over each test run was maintained as required, which is the principal purpose of the test runs. The precedent for the rolling stop used in this test was established at the Wright-Patterson Air Force Base testing laboratory a number of years ago when the Air Force was qualifying military aircraft brakes, and this technique is often used in testing other aircraft brakes.

You may be interested to know that the brakes of the XB70 supersonic bomber were qualified in test runs with a rolling stop.

(b) GAO questioned the sequence in which the normal energy stops and the overload energy stops were run in this test, but GAO admits (GAO Report, page 7) that test sequence requirements were not specified in the contract. The sequence of the normal and overload stops B. F. Goodrich used was discussed with and approved by LTV.

(c) Finally, GAO states (report, page 7) that, for some runs of the test, stators were interchanged between the No. 1 and No. 3 positions within the brake. The report acknowledges B. F. Goodrich's explanation that this was a laboratory technique for studying special wear effects. All components were subjected to the full qualification test, however.

Now the second finding that I refer to as criticism perhaps in the GAO Report relates to alleged discrepancies. The second and only other respect in which the GAO Report is critical is that it states that "Goodrich's qualification report on the results of testing the four-rotor brake contained some discrepancies that might be considered significant."

The alleged discrepancies

I want to say in this connection, Mr. Tremblay has testified here from the Air Force that Goodrich refused to furnish data to the Air Force. This is not a fact. We refused to transport this data to Wright Patterson field, and we offered to submit the data for review at our Troy plant.

Now those are all the facts on the submission of data to the Air Force. We do not take the data out of our plant, and this is our practice I am told for many years. But the offer was made for the Air Force to review this data at the Troy plant.

Chairman Proxmire. Let me just interrupt on this point, please.

Mr. Jeter. Yes, sir.

Chairman Proxmire. Did you at any time say that this data was proprietary?

Mr. Jeter. We did say it was proprietary.

Chairman Proxmire. You said it was proprietary.

Mr. Jeter. And we kept it in our plant.

Chairman Proxmire. But you did say it would be available if the Air Force would come to the plant?

Mr. Jeter. At our plant, yes, sir. We did say, sir, it was proprietary. We did say that.

Now responding to this claim by GAO:

Our answer: Appendix A of the report identified 16 data items characterized as "discrepancies that may be considered significant." That is to say, there are 16 data items criticized out of more than 250 items the GAO examined. Therefore we must conclude that 94 percent of the items were not questioned.

Of the 16 so-called "discrepancies," three of them are against our interests for the purpose of the test report; in other words, three discrepancies showed worse results than the actual data.

Next of the 16 so-called "discrepancies," seven of these items were not discussed or reviewed with our representatives. As I recall the GAO states in the report that it did not have time, or time did not permit or something to that effect, but they were not even discussed with us, so we do not know really anything about what the problem is on them.

Next, the GAO report does not identify the size or importance or relative importance of these alleged discrepancies. During the examination of the test data, we, in fact our engineers who were working with it did in fact observe many "deviations" being noted by GAO which were less than 1 percent.

Finally, the stop times of our qualification report for the five overload stops were taken from a digital tape record. The results of this test are simultaneously recorded by two different methods — one is a digital or computer produced record. The other is a record visually interpreted by the laboratory operator. Whenever these two records of this test are at variance, the computer produced record is accepted. This is our practice, and this is what we did in this instance.

Now there would be discrepancies between the two records, and in those cases we accepted the computer produced record.

In the opinion of our engineers, and I can assure you that in view of the charges made here this matter has been reviewed thoroughly, the data and the entire subject by our aircraft brake engineers at our Troy plant, and it is their opinion that none of the foregoing criticisms are relevant or significant as to whether the brake was or was not qualified.

Now as to the accusations of the Chairman in the statement which he released, I think in view of that statement it is most — well, the statement charged us with falsifying test reports to hide defects in brakes which we had made for this A7D attack plane.

We think it most significant that the GAO report, contrary to the Senator's statement, does not even suggest that test records were falsified.

Now I have read the report a number of times and I have not yet, Senator, found that accusation in it. I have found the section about discrepancies, which I have just finished discussing.

B. F. Goodrich emphatically denies that any test data relating to the A7D four-rotor brake were in any respect falsified.

The Air Force has mentioned here, and I am sorry I did not get all their names, so I will refer to the group, that some data in the report which was presented, did not meet some of the specifications. It must be obvious that these data were not changed so as to make it look like the brake was qualified.

*Comments on
accusation by
Senator Proxmire*

We have presented data which the Air Force says did not meet some of the specifications.

As has already been shown, the field test problems encountered by the four-rotor brake were wholly unrelated to the question of whether the test data on the four-rotor brake were or were not changed.

This entire controversy in our opinion, if I may respectfully say so, completely overlooks the fact that judgments based upon years of professional training and experience are required in the interpretation and evaluation of test data. And I do not mean by this whether a thermometer reads 98 or 108, I am talking about an interpretation and an evaluation of this entire mass of test data, and in arriving at a judgment, a professional decision as to whether this brake qualifies under the test procedures prescribed by the contract. That is what I am talking about.

Judgments must be made to reach reasonable conclusions regarding the likely performance or the product being tested. Test data were not changed or falsified, but in interpreting and evaluating the data the project design engineer arrived at judgments as to the reasonableness and validity of the test results.

This is opinion, based not only upon data but also upon professional training and experience, and may result and in fact I am sure it did, in a rejection of some data in arriving at conclusions.

Obviously, we are talking about something quite different from changing or falsifying data.

As has been said, the judgments of our engineers were correct, because tests we were told — were instructed — to run under a contract would not have produced the problem which arose and there was not any other problem with this brake.

In Senator Proxmire's press release of this past August 4, it was said to have been based upon statements made by a technical writer who formerly was employed by B. F. Goodrich and who left our employ in October 1968. At the outset it should be understood that the technical writer is a high school graduate with no professional training.

Now while we are on that subject, I was informed by our people that Mr. Vandivier was in fact a high school graduate, and he so testified here two or three times, but his application for employment written in his handwriting shows that he attended high school for 2 years, September whatever the date is 1941 to 1943, and under "graduated" the word "no."

For the record just to keep it straight I think I will leave a Xeroxed copy of that employment report.

(The document is shown as exhibit II)

Mr. Jeter. This technical writer told the Senator that he had written in the report that A-7D four-rotor brake was not qualified, and that someone changed the statement to read that it was qualified.

If the Senator had inquired of us, which he did not, we would have told him that the sentence of the report referred to was changed as stated. The change was made by the senior project engineer who was responsible for the ultimate decision as to whether in the light of the test results, as prescribed by the contract, the specifications, and the views of LTV, the brake did or did not qualify.

This senior engineer was of course professionally trained, and through his discussions from day to day with the LTV engineers regarding test results, knew that they had accepted the tests.

Now this, of course, Mr. Vandivier knew nothing whatsoever about. He had nothing to do with contacting the LTV engineer who was on the job watching the day-to-day progress.

Those discussions were held between the senior project engineer and the LTV engineer.

Furthermore, the ultimate decision as to whether the brake was qualified obviously could not be made and should not be made by a technical writer with no professional training.

The conclusion of qualification of the brake was later formally approved by LTV.

Mr. Lawson, who testified here this morning, apparently disagreed with the conclusion that this brake qualified. I may say for your information and for whatever it is worth that Mr. Lawson is an engineer and was an engineer, but this was in fact, so I am told, the first airplane brake upon which he had ever worked. He had come to us, to our employment just shortly before, and the decisions with respect to this brake were in fact made by the project engineer Mr. Warren, who was directly in charge of this project.

The source of the accusations that the company's records were falsified is the technical writer who was a former employee of our company. It has not been easy to find someone who would give any credence to his bizarre tale of the falsification of records.

In the fall of 1968 he attempted unsuccessfully to peddle this story to his employer, the *Troy Daily News*. He next reviewed his accusations with a lawyer. From there he went to the FBI and then on to the General Accounting Office.

Failing to interest any of this impressive group, including two Federal agencies, he then broadcast his tale to the newspapers and magazines throughout the country according to a quote of him in a newspaper the other day.

Significantly, we think, the first public notice given to the story was in the statement of Senator Proxmire on August 4, 1969.

In conclusion I want to say that on the record it has been established that B. F. Goodrich at a reasonable cost, and without any delay in the Air Force schedule, produced a brake for the A-7D, the performance of which exceeded the aircraft requirements. Throughout the entire program there were no safety incidents related to either the 4- or 5-rotor brake.

Further, the GAO, after an intensive examination, and we think it was intensive, has found no evidence of any change or falsification of any data.

Upon that record, we emphatically urge that there be an end to this wholly unjustifiable pointless attack through releases in the national press and congressional hearings which can only be harmful to the fine reputation enjoyed by our company.

Now that concludes my statement. I have Mr. Sink with me. I would like to ask him, if time permits, Mr. Chairman, to comment on three or four items very briefly, if I may do that.

Chairman Proxmire. Very good. Time is getting along but I think that is only fair.

Mr. Sink, you go right ahead.

Mr. Jeter. Mr. Sink, you have been referred to in the testimony here this morning by I think both Mr. Vandivier and Mr. Lawson.

Did you tell either Mr. Vandivier or Mr. Lawson to make any changes in the report as they were writing the report?

Mr. Sink. During the time that this report was written, I was on the west coast supervising the certification tests on the 727-200 aircraft. That was during the months of April, May, June and up to the early part of July. I had reviewed some of this data prior to leaving for the desert, but it had not gotten into report form yet.

Mr. Jeter. Who, in fact, would have directly supervised the writing of this report during this period that you were away?

*Mr. Jeter's
conclusion*

*Statement by
Mr. Sink*

Mr. Sink. In my absence John Warren, senior project engineer, assumed this duty.

Mr. Jeter. Reference has been made, Mr. Sink to a photograph, and mention I think if I understood it of an extra pressure disk or something, whatever that statement was. Would you just comment on that briefly?

Mr. Sink. Yes, sir. In the Mil Spec, the purpose of the worn-brake RTO, as Mr. Tremblay has told you, is one for information only. Also, as has been stated, prior to putting in the pressure plate, we actually had a spacer prior to the 45 stop condition. This also is well known. The pressure plate was put in so that adjusters could be installed and the correct pressures run for this RTO stop.

As far as our ability to evaluate the heat stack for its capability to conduct an RTO, it did not change in one way the capability of the brake to demonstrate performance.

Mr. Jeter. Were adjustments made in the data to make -- in the report I mean of the data, to make the brake look better than it really was?

Mr. Sink. Yes, sir; but not to make it look better. If I may ask the Senator a question concerning --

Chairman Proxmire. This is unusual procedure, Mr. Jeter.

Mr. Jeter. Yes, you are getting a little bit out of bounds.

Chairman Proxmire. I will be happy to let you do it, and if you want to ask me a question I will be happy to reply.

Mr. Sink. Fine, thank you, sir.

Mr. Jeter. I did not suggest this, Senator, I assure you.

Chairman Proxmire. Perfectly all right.

Mr. Sink. The submission that I believe was made earlier contains several of these changes which were made, and which were reviewed by the GAO. One of these changes that was made, of course, is that on the overload stops, the pressure was run at approximately 850 p.s.i. In the report you will see that this has been corrected to show the correct pressure to compensate for the adjusters which were not present during the overload stops, and what this would show is what the correct pressure would have been if the adjuster pressure were compensated for.

Another example is on the 45-stop condition stop time, and the 5-stop condition stop time. When the original copy of the report was submitted to engineering, Mr. Warren determined from the data presented that the stop times which were taken from the dynamometer log sheet and the torque traces, which were shown to represent the torque curve, did not coincide. There was a difference in stop time. Mr. Warren had a torque trace plot made from the digital data, and he determined from this what the actual stop time was, and informed LTV of these stop times, since they were longer than the specification stop time allowance.

It is our understanding that LTV in turn discussed these stop times with the Air Force, and that LTV told us that these stop times were acceptable, to present them as we got them off the digital data and they would be acceptable to LTV. They subsequently did approve the report.

Now we also found an example in this report where after going over the report in the July 27, 1968, session, to see how the raw data checked actually with the report, we found that at stop 33 of the tire change, that thermocouples for the fuse plug, bead seat, and tube well were interchanged on the slipring and what we detected up to stop 33 they had been reading in order: tube well bead, seat, fuse plug. We found after stop 33 they were reading in sequence bead seat, fuse plug, tube well.

Mr. Jeter. These two readings, I do not understand this myself.

Mr. Sink. In this situation what I am pointing out — —

Mr. Jeter. The reading before and the reading after, were they near one another or quite different? This is what the Senator and the Congressman would like to know.

Mr. Sink. Yes, sir. We determined from this that here was another case where we should have changed the data from the raw data that was presented because it was perfectly obvious that when you have temperatures running in a sequence, during parts of the test they are not going to just arbitrarily change and run in a completely different sequence from one stop to the next. So there were areas where we should have changed the data in the report from the raw data, but we missed it due to the relative unimportance of these temperatures compared to other data that we did observe more closely.

Mr. Jeter. Does that answer your question? You might say a word about comparison, for example, of brake design program for an aircraft for a military fighter plane as compared with the design of an aircraft brake for —

Chairman Proxmire. Will this be the last?

Mr. Jeter. Yes, sir; it will, Mr. Chairman.
For a commercial plane?

Mr. Sink. Brakes for commercial aircraft are designed like work horses, since these things perform many stops every day, day in day out service accumulating many stops in a very short period of time. There is a lot of beef in them. They are the — well, work horse is a good comparison.

The fighter aircraft, by comparison to this, is more like a thoroughbred horse. It is skinned down. There is not an ounce of excess weight in it. It is very high performance, and as a result of this, the development program required to develop these fighter plane brakes is much longer than it is for commercial brakes.

Mr. Jeter. Let me say only one word, Mr. Chairman, if I may.

I understand quite well, I think, that the Chairman and members of this committee are concerned and should be concerned that the Government gets and obtains good products when it is required to buy them, and that it buy these products at a reasonable cost. This is a very proper concern of this committee, and I understand that.

I do want the committee to understand likewise that we at the B. F. Goodrich Co. have this same concern, identical concern. We are in this business. We are very big at it. We hope to continue in it for, well, more years than I can say, and we do not know of any way to continue in it and be successful and be one of the major producers and suppliers in the world than to produce quality products at reasonable prices. There is not any other answer, because this is a competitive field.

I do want to thank you, Mr. Chairman, and Mr. Conable, for your attention to our statement.

Chairman Proxmire. I want to thank you, Mr. Jeter and Mr. Sink. It is a vigorous, forthright statement. There is no question where you stand on this and it is very helpful.

At the same time, just to take up what you have said, I think I would not be a responsible member of the Senate if two men coming to me as these two men did with what I thought was a sincere effort to express their concern about this very serious matter and told a story that sounded plausible, if I had not asked that an investigation be made. I did that.

*Interrogation
of Mr. Jeter
and Mr. Sink*

The GAO made an investigation. You and I differ very much on what the GAO said.

Let me just start with that.

You say in your statement that, "The GAO report does not even suggest that test reports were falsified." Well, falsified is a word of intent which I am sure the GAO and everybody else is very careful about using. I did use it frankly in my release.

We did have testimony by the GAO engineer this morning and he told us that data did not show an honest picture.

Now —

Mr. Jeter. If I may interrupt.

Chairman Proxmire. Yes, sir.

Mr. Jeter. This is something he has added since the report was written.

Chairman Proxmire. Well, yes.

Mr. Jeter. OK.

Chairman Proxmire. As I say, when I asked the GAO to conduct an investigation of this, I did not anticipate that they would come in, and they never do come in, and make charges that somebody is lying or that kind of thing. They do their best to find out what the facts are with relation to the data, with the substantive data which is being considered whether it is accurate or inaccurate, so that when I asked them whether this was an honest picture or not, I think that their answer to me satisfied me in that regard. But I think that you and I could talk, argue all day about whether this was falsification or whether it was a discrepancy that cannot be so categorized.

Mr. Jeter. Let me say I am not to any degree whatever questioning the chairman's motives. I want to make that clear.

Chairman Proxmire. All right.

Now let me ask you this. Professional engineer opinion has been unanimous, designer Searle Lawson, your employee, Air Force engineer expert, Bruce Tremblay, and GAO engineer, Guy Best, have all testified this morning that the engineering practices at B. F. Goodrich in qualifying the four-rotor brake was unacceptable. In fact, each of these gentlemen has testified this morning that Goodrich is still making questionable statements about the AD-7 four-rotor brake, this morning, for example, from your statement. You say, "It has never been determined whether the knitting problem resulted from brake design or was because of incompatibility between the brake and associated parts of the braking system."

As I recall, Mr. Best said that he was not sure on the basis of the data he had that he could make an assertion on that. The other two men were emphatic in saying that the knitting problem did result from the brake design.

Then in the second place they all testified where you say it is most significant "that the four-rotor brake knitting problem referred to above could not have been predicted from the indoor laboratory tests which the contract required regardless of how precisely these tests may have been performed." There again they disagree and their disagreement seems to be one of impressive unanimity.

Mr. Jeter. The record will show, Mr. Chairman, but I think they testified as a general proposition and without any reference to the tests prescribed by the contract.

Chairman Proxmire. And then that they also testified where you say, "It was the judgement of the responsible B. F. Goodrich aircraft brake engineers at that time four-rotor brake satisfactorily performed the indoor tests and was ready for field testing on the AD7," they disputed this.

Mr. Jeter. Yes, sir.

Chairman Proxmire. So that the experts that we have here disagree with you. Now let me ask you did B. F. Goodrich personnel add a spacer to the brake that was undergoing qualification tests? Did you testify that they did?

Mr. Jeter. I am sorry, I did not hear the question.

Chairman Proxmire. You testified on this picture.

Mr. Jeter. Yes, sir.

Chairman Proxmire. On the basis of that picture and the other testimony I am asking you did B. F. Goodrich personnel add a spacer to the brake that was undergoing qualification tests?

Mr. Sink. Yes.

Chairman Proxmire. And that to assure that the brake would not run out of piston travel during the tests?

Mr. Sink. Yes, sir.

Chairman Proxmire. Didn't the other engineer say that that was unacceptable?

Mr. Sink. The other engineer was not in a position to know whether it was acceptable or not, Senator. In fact, I think if you will look again at the — —

Chairman Proxmire. When you say the other engineer you are referring to Mr. Lawson?

Mr. Sink. Yes, sir.

Chairman Proxmire. Why wasn't he in a position to know? He was the employee of Goodrich. You gentlemen hired him and you gave him this assignment. It was your responsibility to put a competent man on it.

Mr. Sink. This is true, and he was a new engineer. We did try to give him guidance, but he preferred to have his own convictions.

Chairman Proxmire. You did try to give him guidance but he preferred to have his own convictions?

Mr. Sink. Yes, sir.

Chairman Proxmire. An interesting response.

Mr. Jeter. I think it is quite understandable if I may say so, Mr. Chairman. He is a new employee. This is the first brake he has worked on. He is directly supervised by Mr. Warren, who is a very experienced design engineer, who has been with our company many years and designed many, many brakes.

I cannot believe this young man knew everything there was to know about brakes, and I am not criticizing him.

Chairman Proxmire. Nevertheless, it was testified by the other independent experts that the insertion of this kind of a spacer was not acceptable. Do you feel that those men are not qualified?

Mr. Sink. As pointed out under item 2 under a spacer — —

Mr. Jeter. You are referring to what?

Chairman Proxmire. The spacer you have in that picture in front of you.

Mr. Sink. I am referring to what I assume was introduced earlier. It says following the overall stops the stack deflections was eight hundred fifty-nine one-thousandths and the minimum travel allowable, the maximum to be more than this but the minimum with all the tolerances was eight hundred eighty one-thousandths which says had there not been a spacer in there the piston still would not have bottomed.

We had gone through the 45-stop test and this takes quite a while to do. We wanted to assure ourselves that the pistons would not bottom-out, and discontinued the test on this heat sink that had the 45 stops so the spacer was put in as a precautionary measure.

Chairman Proxmire. Now that the Air Force has indicated this is not acceptable you continue to test your brakes this way?

Mr. Sink. If we had the same situation come up today I believe the thing we should probably have done was to go back to LTV and let them go to the Air Force to have the Air Force witness this test.

I believe under these conditions that this procedure would be approved if it were properly handled beforehand.

Chairman Proxmire. Was in fact the wheel allowed to coast to a stop as indicated by GAO and confirmed by Mr. Vandivier's testimony this morning?

Mr. Sink. Yes, sir.

Chairman Proxmire. It was?

Mr. Sink. Yes.

Chairman Proxmire. And is this, Mr. Sink, a standard test procedure in the B. F. Goodrich, Troy, Ohio field and brake plant?

Mr. Sink. This is a common procedure. I would not say it is a standard procedure. It is a common procedure, and it has precedence in that this procedure was used for the qualification of military brakes when Wright Field was qualifying military brakes in that facility.

Chairman Proxmire. Didn't the Air Force say that this is unacceptable as quoted in the GAO report?

Mr. Sink. I have heard that this has been quoted in that report.

Chairman Proxmire. Once again, here is the same kind of a problem. The Government experts who testified to us tell us that this is not an acceptable procedure to give valid results.

Mr. Sink. But our contracting agency, sir, is LTV, and we discussed this procedure with LTV engineering and they approved this procedure prior to our conducting these tests.

Chairman Proxmire. You have a responsibility, I am sure both of you gentlemen are very honorable gentlemen, you recognize you have a responsibility to the Federal Government, too.

Mr. Sink. Yes, sir.

Chairman Proxmire. You are producing a plane, a product ultimately to be used as a U.S. plane, and in view of the fact that the policies adopted by the Air Force, which is the ultimate customer, seem to contradict your position, it would seem to me that that would govern rather than any negotiations or any agreement you might make with the contractor.

Mr. Sink. It is always the function of the contracting agency to set up the requirements for the design and qualification of a brake, and where the contractor has set up these requirements, these take precedence in many or most cases over the military specification.

Chairman Proxmire. Mr. Vandivier has testified before this committee that there are more than 80 falsifications of data in the Report 26031. He and others that are or were employed by B. F. Goodrich wheel and brake plant in Troy contend that they were coerced by their superiors into writing a distorted qualification report. Would you agree that there is misinformation in this report?

Mr. Sink. I would say that the information that is in the report presents a fair analysis of the performance of the 4-rotor brake during the qualification testing. There have been changes made in the data as we have noted before, but only to make them more consistent with the overall picture of the data that is available.

Chairman Proxmire. You stand alone in making that assertion. No other witness has indicated that. Certainly the GAO did not indicate it, the Air Force did not indicate it, neither did of course Mr. Lawson who is the engineer directly working on this project. Why do you need a 5-rotor brake if this is the case?

If this 4-rotor brake is qualified, why did you have to go to the trouble and expense to yourself of the 5-rotor brake?

Mr. Jeter. Let me answer, Mr. Chairman.

When you say this brake, the 4-rotor, 5-rotor or whatever, is qualified, when we say this in our report, which we did, to the prime contractor, we are not saying this brake will fly on an airplane. We have not flown it on an airplane. We are saying that this brake is qualified under the specifications and tests prescribed by the contract, period, the indoor tests prescribed by the contract. We cannot state that the brake will pass flight test.

Let me say just this about this whole subject. If this science were such an exact science that we could design and produce a brake with or without, say with laboratory tests, and this brake will perform on an airplane exactly as it is supposed to, then there would be an absolute waste of money to conduct these flight tests, and they conducted almost 300 of them here, an absolute waste of money to conduct the tests. You just put them on the plane and fly it.

Chairman Proxmire. With all due respect—

Mr. Jeter. I mean why do you have the flight tests?

Chairman Proxmire. Why did you change the design? Why did you go from a 4-rotor brake to a 5-rotor brake if the 4-rotor brake met the qualifications?

Mr. Jeter. Well, the problem developed in flight. What I am trying to say to you is that we said the brake qualified on the basis of the laboratory test prescribed for us by the contract, and we do not certify to another thing. We cannot. We have not even had the brake working in conjunction with the rest of the braking system. We have not even seen that happen.

All we can certify to, and I think this ought to be clear, is that on the basis of the tests prescribed by our contract, the laboratory tests prescribed by our contract, we think the brake is qualified. It meets the qualifications as shown by laboratory tests, not flight tests if you please.

Chairman Proxmire. Now you have changed your method of testing between the four- and five-rotor procedure. You stated, "This problem is that the brake linings knitted or fused slightly at low speeds."

Then you say, "It has never been determined whether the knitting problem resulted from the brake design or was because of an incompatibility between the brake and its associated part of the braking system."

Then you say—this is with regard to the five-rotor—"Special laboratory tests were performed with the system in order to simulate the knitting problem."

So you obviously felt that the first tests were inadequate in that regard, because you used a new test procedure which you have testified with great emphasis in your view, although others seem to disagree—

Mr. Jeter. I do not think anyone has disagreed with what I say on that subject if I may say so, Mr. Chairman.

Chairman Proxmire. Mr. Lawson flatly disagreed. I asked him that question.

Mr. Jeter. Mr. Lawson, I do not think, addressed himself to the fact. If I may disagree with you, I do not think the record will show that anyone in this room today except myself has testified with respect to the fact that we obtained from LTV the complete braking system, and that we designed special tests with the entire braking system to try to produce this knitting or sticking or whatever you want to call it, and we did that in an effort to determine, Mr. Chairman, whether we could get a different composition, a different brake band that would in fact work in this four-rotor brake and would eliminate this knitting problem, but no one else has testified about this that I have heard.

Chairman Proxmire. Mr. Jeter, I have here documentation from your own plant signed by Mr. Gloor, the engineer, who says--

Following stop number 49 the fuse plug material melted entirely.

It goes on to say--

Brake pressure was released on the brake when the velocity reached 10 to 15 miles per hour. The following abnormal procedures occurred. Stators numbers 1 and 3 were physically switched after stop number 30 and remained in those positions to the conclusion of the test. Of the 5 overload stops were conducted with a lining carrier placed between the housing and the pressure plate.

and so on.

And he concludes as follows:

In view of the aforementioned it is the writer's opinion that subject brake assembly is not a fully-qualified item.

This is another expert engineer, your Goodrich engineer. Now would you say that your Mr. Gloor is incompetent, not qualified?

Mr. Jeter. I will ask Mr. Sink. I do not know Mr. Gloor.

Mr. Sink. Here again Mr. Gloor had just joined our organization, and he had joined the A-7D as test engineer taking over from who had carried it through the early development, so he had only been with us a very few months, and had no wheel and brake test experience at all prior to starting into the A-7D program.

Chairman Proxmire. What was this man's qualifications, this Mr. Gloor, who along with Mr. Lawson had responsibility in this area?

Mr. Sink. To the best of my knowledge he has been an instrumentation engineer at McDonnell.

Mr. Jeter. Where?

Mr. Sink. McDonnell.

Mr. Jeter. McDonnell Aircraft.

Chairman Proxmire. He is another independent engineer, independent in the sense he was newly hired. He worked for you--was employed by you. You are hiring people who appear to be incompetent on the basis of your testimony here.

Mr. Jeter. "Inexperienced," if I may substitute a word for you, Mr. Chairman. If a new man is ever going to be hired, he has to be hired inexperienced, and I do not see any carelessness in hiring people because they have never had experience. The question is whether you give them adequate supervision until they get the experience.

Chairman Proxmire. Isn't it true that the instrumentation which is where Mr. Gloor had his experience, the instrumentation went wrong?

Mr. Sink. I do not know whether you could say it went wrong. It was a matter of interpreting what came off of it.

Chairman Proxmire. In this area Mr. Gloor should be qualified.

Mr. Sink. When you take data from several different sources, you have to rationalize among these data what is the true story. This is part of your engineering know-how.

Chairman Proxmire. What was that again, you have to rationalize data?

Mr. Sink. You have to look at the data rationally from experience and make an engineering judgment as to which—

Chairman Proxmire. We have had man one and man two tell us that that is the case.

Mr. Jeter. Yes.

Chairman Proxmire. And Mr. Gloor says it—

Mr. Jeter. I told you we have 30-odd engineers at this plant, and most of them very experienced and very knowledgeable, and I say to you it is incredible that these men would stand idly by and see reports changed or falsified or whatever word you want to use when they have knowledge of it and they are responsible engineers. I mean you just do not have to do that working for anybody. I think you understand that and especially if you are a qualified engineer in some specialty such as the design and testing of brakes. Just nobody does that.

Chairman Proxmire. Finally, I would just like to ask you why after the GAO investigation did GAO recommend changes in the Government's responsibility for brake testing procedures, if the procedures were all right, and why in fact has there been an actual change in procedure in the Dayton, Ohio area where the Troy Wheel and Brake Plant is located? As I understand before this the four-rotor brake, for example, was tested as we have had testimony this morning, not in the presence of the Air Force and not in all cases in the presence of LTV.

On the other hand, the five-rotor brake has been tested in the presence of all the Air Force, LTV as well as—

Mr. Jeter. Well, I want to make no defense of the test specifications prescribed by our contract, by LTV, and whether it should have been changed, or whether the GAO is right in suggesting that an Air Force man should be present. Maybe they are right in that recommendation. I am not quarreling with it.

The Government, at least, would have somebody on the job seeing what is happening. We do not have any quarrel with it. They can have two there if they like, but we did not design this program. We were given a contract and test procedures in it and that is it.

Chairman Proxmire. Mr. Conable?

Representative Conable. Thank you, Mr. Chairman.

Mr. Jeter, I have only one question and that relates to the interests of the Government in this affair.

Mr. Jeter. Yes, sir.

Representative Conable. Can you give us an assurance that the Government will not at any time incur increased costs as a result of the necessary changes over from the four-rotor to the five-rotor brake? A statement was made here by the GAO that it was possible some of these additional costs could find their way into overhead, and that interested me because it would not be normally part of overhead.

Mr. Jeter. Yes.

Representative Conable. And I just want to understand from your point of view, obviously your company has had some additional costs as a result of having to change.

Mr. Jeter. Right.

Representative Conable. From a brake that had some flaws to one that is functioning properly?

Mr. Jeter. Yes, we just designed two brakes and tested two instead of one for the same cost. This point or this mention in the GAO report I have discussed with our engineers. I, of course, have no personal knowledge of it. I have discussed it with our engineers, and the head of our aerospace division in Akron, and I am assured that there was no additional cost to the Government in any form or manner whatsoever. There were no additional costs.

Representative Conable. Thank you.

That is all, Mr. Chairman.

Chairman Proxmire. Thank you, Congressman Conable.

And thank you, Mr. Jeter and Mr. Sink. I know this is a most unpleasant and a difficult job for all of us. You did a fine job and I appreciate the responsiveness you have given us.

Mr. Jeter. Thank you very much.

Chairman Proxmire. The committee will stand adjourned.

(Whereupon, at 1:05 p.m. the Senate Subcommittee on Economy in Government of the Joint Economic Committee adjourned, to reconvene subject to the call of the Chair.)

A7D Meeting—July 27, 1968

PERSONNEL: R. L. Sink; J. H. Warren; K. W. Vandivier; and S. J. Lawson.
SUBJECT: Review of Data to Be Presented to LTV.

Item 1: A. 10 mph cut pressure:

- (1) LTV concurrence.
- (2) Brakes-on velocity increased to get correct energy into brake.
- (3) Needed Item 1 because of constant pressure, torque build-up, small footprint of tire on smooth runway surface.

Item 2: A. Spacer:

- (1) Dimensions indicated a possibility of running out of piston travel which would lose the 45 stop heat sink. Spacer added as a precaution.
- (2) Measurement of lining and disks after O.L. stops shows that spacer was not required:
 - (a) Average stack wear after 45 stops plus clearance and deflection=.768.
 - (b) Average stack wear after O.L. plus clearance and deflection =.859.
 - (c) Minimum allowable piston travel = .880.
- (3) O.L. stops were run without adjusters at approximately 850 psi. Report was adjusted to show pressure used plus 140 psi for adjuster.
- (4) As a result of marginal piston travel, pistons and sleeve redesign is in process.
- (5) There would be no safety problem on A/C as brake removal is controlled by wear pin indicator.

Item 3: Spacer for RTO:

- (1) Needed spacer for piston travel after O.L. and didn't want to lose worn brake RTO data.
- (2) Specification was 2.15×10^6 KE. BFG ran test at 2.17×10^6 KE. Specification was revised to 2.17×10^6 KE.
- (3) Pressure plate was used as spacer so adjusters were in brake for RTO. As a result, raw data and report pressure data agree.
- (4) Demonstration shows that heat sink is capable of specification RTO energy at any time prior to removal of brake for wear, as shown by wear indicators.

Item 4: A. Turn-Around Capability Test:

- (1) Peak temperatures required by specification are confirmed by raw data. Cool down rates from raw data to be plotted on report graphs to determine variation.
- (2) Bead seat and false axle required by specification.
 - (a) Phase I, Cycle 3 temperatures required by specification are accurate.
 - (b) Phase I, Cycle II, peaks are O.K., curves are off. The profile curves are manufactured.
 - (c) Phase I, Cycle III, some temperatures are manufactured.
 - (d) Phase II, temperatures manufactured. Bead seat thermocouple shorted out, false axle peaks at 411° F. reported 280° F.
- (3) Normal energy stops are 1.0×10^6 KE higher than specification requires.

Item 5: A. Peak torque on the normal energy log sheets:

- (1) Peaks were picked off tape data by data analysis checks. The peaks selected were actually a result of noise on the tape and not peak torque values. These were not detected when the report was checked. Example: Report shows stop No. 1 peak at 12,070 ft-lbs, it is actually 8,590 ft-lbs.
- (2) Peak torque survey test valves are correct.

Item 6: A. (1) Tube well temperatures on normal energy log sheets were corrected on stops 3, 4, 5, 18, and 20.

- (a) Recorded 379—Reported 270—Stop 3
- (b) Recorded 428—Reported 379—Stop 4
- (c) Recorded 428—Reported 255—Stop 5
- (d) Recorded 375—Reported 255—Stop 18
- (e) Recorded 375—Reported 239—Stop 20

Item 6: A. (2) No. 2-360-360, No. 6-270-270, No. 19-379-379

- (3) Stop 3 and 4 on log sheets have been reversed.
 - (4) Stop 5 was run as a hot park stop condition (operator error).
 - (5) Stop No. 33 tire change. Thermocouples for fuse plug, bead seat, and tubewell mixed up.
 - (a) Prior to stop No. 33, high to low temperature.
T.W.→B.S.→F.P.
 - (b) After stop No. 33, high to low temperature.
B.S.→F.P.→T.W.
- (Operator error.) Temperatures that are read for B.S. after stop No. 33 is for the T.W., etc., for F.P.→B.S. and T.W.→F.P.

Item 7:

- A. Drag load and clearance:
 - (1) 34 was 16 lbs. changed to 10 lbs.
 - (2) 37 was 12 lbs. changed to 9 lbs.
- B. Clearance was taken incorrectly, report what we felt was correct.

Item 8: A. Overloads:

- (1) Temperatures
 - (a) Stop No. 46, CS thermocouple out--reported 1535° F.
CS on other O.L. stops 1512-1558-1562-1558
 - (b) No. 46 tubewell recorded 301, reported 192° F.
No. 47 tubewell recorded 367, reported 367° F.
No. 48 tubewell recorded 528, reported 422° F.
No. 49 tubewell recorded 509, reported 463° F.
No. 50 tubewell recorded no reading, reported 210° F.
- (2) Raw data temperatures for stop No. 47 correlates well. Send in for typical stop.

Item 9: A. Worn Brake RTO:

- (1) P.H. recorded 390, reported 355
- (2) F.A. recorded 521, reported 482
- (3) B.S. recorded 590, reported 580
- (4) F.P. recorded 486, reported 438
- (5) T.W. recorded 669, reported 673
- (6) Fluid recorded 400, reported 350
- (7) Rotor recorded 2180, reported 2100

Item 10: A. New Brake RTO:

- (1) P.H. recorded 471, reported 453
- (2) Axle recorded 469, reported O.K.
- (3) Tubewell recorded no data, reported 480.

SUMMARY

Typical raw data to be supplied to LTV.

- (1) Normals
 - (a) No. 33--no fans
 - (b) No. 35--with fans
- (2) Overloads
 - (a) No. 47

Note: Tell LTV that peak was reached after chart ended, for overload stop number 47.
- (3) New RTO
 - (a) O.K.
- (4) Turn-Around--Cycle 3, Phase 1

S. J. LAWSON

A7D MEETING—JULY 27, 1968

SUBJECT: TYPICAL RAW DATA TO BE SUPPLIED TO LTV

- A. Normals
 - (1) Stops
 - (a) No. 33—no fans
 - (b) No. 35—with fans
 - (2) 10 mph cut pressure
 - (a) LTV concurrence
 - (b) Brakes-on velocity increased to get correct energy into brake.
 - (c) Needed Item 1 because of constant pressure, torque build-up, small foot-print of tire on smooth steel road surface.
- B. Overloads
 - (1) Stops (a) No. 47
 - (2) Spacer
 - (a) Dimensions indicated a possibility of running out of piston travel which would lose the 45 stop heat sink. Spacer added as a precaution.
 - (b) Measurements of lining and disks after O.L. stops shows that spacer was not required.
 - i. Average stack wear after 45 stops plus clearance and deflection=.768.
 - ii. Average stack wear after O.L. plus clearance and deflection=.859.
 - iii. Minimum allowable piston travel=.880.
 - (c) O.L. stops were run without adjusters at approximately 850 psi. Report was adjusted to show pressure used plus 140 psi for adjuster.
 - (d) As a result of marginal piston travel, pistons and sleeve redesign is in process.
 - (e) There would be no safety problem on A/C as brake removal is controlled by wear pin indicator.
- C. New brake RTO (1) Tubewell recorded no data, reported 480.
- D. Turn-Around—Cycle 3, Phase I
- E. Peak torque on normal energy log sheets.
 - (1) Peaks were picked off tape data by data analysis clerks. The peaks selected were actually a result of noise on the tape and not peak torque values. These were not detected when the report was checked. Example: Report shows stop No. 1 peak at 12,070 ft-lbs; it is actually 8,590 ft-lbs.
 - (2) Peak torque survey test values are correct.

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McCormack Company **A-12-43**

APPLICATION FOR EMPLOYMENT

Before Acceptance as an Employee Every Applicant Must Pass a Physical Examination & Reference Check Satisfactory to the Company.

Name Vandivier, Kermit Wilson Date December 5, 1967
 Street P.R. 2 City Clinton State Indiana Telephone No. Te. 2-8936
 Social Security No. 365-24-2695

FOR WHAT POSITIONS ARE YOU APPLYING? Capital Placement Service HAVE YOU PREVIOUSLY APPLIED HERE? No WHEN COULD YOU REPORT FOR WORK? Jan. 1, 1968
 STATE WHO REFERRED YOU TO US FOR EMPLOYMENT Capital Placement Service WERE YOU EVER EMPLOYED BY E.F. MCCORMACK CO. SO, WHEN AND WHERE? No

DATE OF BIRTH 11-2-1926 SEX M HEIGHT 6'11" WEIGHT 210 SINGLE, MARRIED, WIDOWED, SEPARATED MARRIED HOW MANY CHILDREN 6 TOTAL DEPENDENTS 7 DO YOU OWN OR RENT YOUR HOME? RENT DO YOU OWN FURNITURE? Yes
 AMOUNT OF LIFE INSURANCE YOU CARRY \$600 WITH A CARD Yes YEAR Phy. 11-1956 ARE YOU A U.S. CITIZEN? Yes HAVE YOU EVER BEEN REFUSED SERVICE? No BY WHOM? No
 NAME OF HUSBAND OR WIFE E. J. Vandivier WHERE EMPLOYED? No
 DO YOU NOW HAVE OR HAVE YOU EVER HAD ANY PHYSICAL OR HEALTH DEFECTS? No IF YES, DESCRIBE FULLY No
 HAVE YOU EVER FILED A CLAIM OR RECEIVED PAYMENT FOR TEMPORARY OR PERMANENT DISABILITY AS A RESULT OF PREVIOUS EMPLOYMENT OR MILITARY SERVICE? No IF YES, DESCRIBE FULLY No
 HAVE YOU EVER BEEN ARRESTED? (OTHER THAN MINOR TRAFFIC VIOLATIONS) No IF YES, STATE WHEN No WHERE No VIOLATION No

TO WHAT ORGANIZATIONS DO YOU BELONG? (OTHER THAN RELIGIOUS, RACIAL, OR POLITICAL) No

EDUCATION

	NAME AND ADDRESS OF SCHOOL	DATE FROM TO	GRADUATED YES NO	DEGREE RECEIVED	MAJOR	POINT AVERAGE OR RANK IN CLASS
HIGH SCHOOL	<u>Wiley High School</u> <u>Terre Haute, Indiana</u>	<u>1944</u> <u>June 1943</u>	<u>Yes</u> <u>No</u>	<u>None</u>	<u>Math</u>	
COLLEGE						
GRADUATE SCHOOL						
OTHER	<u>Post Alpha College</u> <u>Post Alpha Texas</u>	<u>July 1948</u> <u>Dec 1948</u>	<u>Yes</u> <u>No</u>	<u>None</u>	<u>Math</u>	

HOW DID YOU FINANCE YOUR COLLEGE EDUCATION? SPORTS TEACHING TRAVELING

LIST EXTRA-CURRICULAR ACTIVITIES IN HIGH SCHOOL, AND COLLEGE. SHOW OFFICER HELD. SPORTS TEACHING TRAVELING

WITH WHAT FOREIGN LANGUAGES ARE YOU FAMILIAR? None

CHECK BELOW

SPEAK	READ	WRITE
<u>None</u>	<u>None</u>	<u>None</u>

PUBLICATIONS: None

SCHOLARSHIPS, FELLOWSHIPS, HONORS: None

EXHIBIT 2